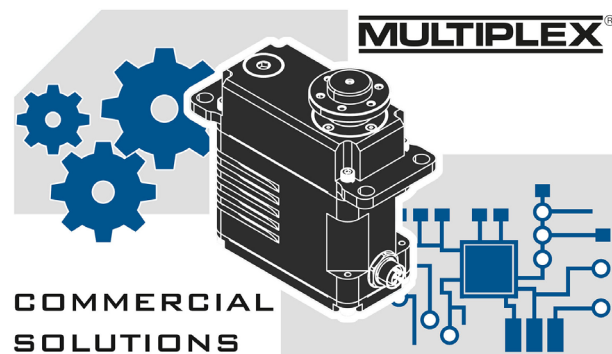
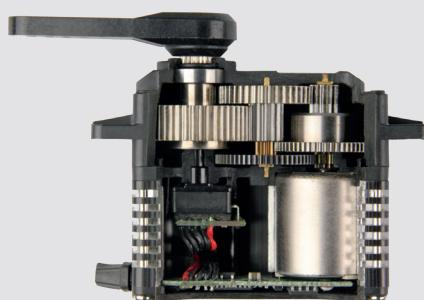




Innovative solutions for  
industrial applications

Actuators and servos



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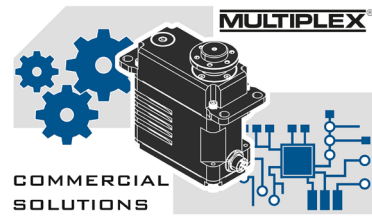
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Since 2002, MULTIPLEX Modellsport GmbH & Co.KG, based in Bretten, Germany, is part of the South Korean HITEC Group.

The products of Hitec RCD Korea, Inc. are used worldwide and, due to their diversity, are suitable for a wide variety of applications. For example, they are used as servos in the UAV sector, as actuators for automation and handling tasks in industry, or as actuators for the active aerodynamics of a racecar.

We will be happy to send you detailed specifications and additional information on request.

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MULTIPLEX Modellsport  
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Hitec RCD Korea, Inc.



Hitec Group USA, Inc.



Hitec-MULTIPLEX Japan, Inc.



Hitec RCD Philippines, Inc.

## PRODUCT OVERVIEW

### Servos and linear actuators

HLS-series linear actuators

SG-series servos

HSB/HSR-series servos

D/DB/MD/MDB-series servos

Other servos for related industrial applications

### Servo accessories

a. Programming devices

b. Servo output arms





# ANALOGUE ACTUATORS

Analogue actuators are generally low-priced to mid-priced items, and most of them are equipped with inexpensive components. The motor is always a D.C. brushed unit. Actuators offer no user-programmable options. Communication is always based on a PWM signal with a frequency of 50Hz. The motor PWM is the same as the control frequency, i.e. it is also 50Hz. This means that the possibility to control activity (motor on or motor off) only occurs every 20ms. Slow movements or small corrections result in long motor-off periods in relation to motor-on periods. The motor voltage is always the same as the power supply voltage.

## Advantages:

- Reasonable price
- Pleasant running sound thanks to low motor frequency
- Low power consumption

## Disadvantages:

- Low holding moment
- Slow response characteristics
- Low resolution due to low control frequency
- Wide deadband (20ms)
- Slow movements may not be smooth

# DIGITAL ACTUATORS

Digital actuators generally fall in the high mid-range to high-price category. Very high-quality components may be used, such as Hall sensors for position sensing, as well as brushless D.C. motors. Communication is based on a PWM signal with frequencies up to 330Hz (according to actuator type) or other interfaces such as CAN, UAVCAN, RS-485 or TTL. The motor frequency is independent of the control system and is usually in the range 300 - 500Hz. This results in a very small possible deadband of up to 2ms. Digital actuators also offer wide-ranging programming and protective functions, as well as allowing two-way communication (feedback) depending on type.

## Advantages:

- Fast response characteristics
- Fast corrective activity
- High holding power
- User-variable deadband
- Good accuracy
- Two-way communication
- Programmability
- Safety functions
- High resolution

## Disadvantages:

- In most cases more expensive
- In some cases unpleasant running sound due to high motor frequency
- Higher power consumption



# INTERFACES

## PWM communication

The conventional method of controlling Hitec actuators, with many advantages for simple tasks. Hitec PWM actuators can be controlled using a pulse width of 900 to 2100µs. The usual control frequency is 50Hz (20ms), but frequencies up to 330Hz are possible with particular actuator types for special applications.

Actuators with PWM communication can easily be controlled at low cost, and they are adequate for many applications where feedback is not required.

The interface is in widespread use, and many controllers offer suitable presets and libraries.

Pin layout of Hitec PWM actuators\*



## RS485 and TTL communication

There are a number of applications in several fields of operation for which feedback of the actual servo position is required, or at least desirable. Certain Hitec actuators are also available with RS485 and TTL interfaces, which enable them to work with two-way communication (feedback).

Hitec RS485 and TTL actuators communicate with external devices using the half-duplex process. TTL actuators of this type feature just one signal wire in addition to the voltage and earth conductors, whereas RS485 actuators feature two signal wires.

Pin layout of Hitec TTL actuators\*



Pin layout of Hitec RS485 actuators\*



## CAN and UAVCAN communication

The industrial and UAV field is becoming increasingly significant. This progressive, fast and technically highly complex market demands innovation and reliability. Many applications require intelligent solutions and genuine feedback of position, torque and other parameters in order to assess the application or to gain information about the condition of the components.

The following protocols are available: CAN 2.0A, CAN 2.0B, DRONECAN, UAVCAN

Pin layout of Hitec CAN actuators (not applicable to the SG-series)



\* Can be supplied fitted with the client's choice of connectors upon request.

# FEATURE OVERVIEW

## Mid-point and end-point adjustment (EPA / Neutral Settings)

Provides programmable mid-point and end-point servo positions.

## Direction of rotation

Clockwise (CW) = when viewed from above, the servo output rotates clockwise when the signal width is increased.

Counter-Clockwise (CCW) = when viewed from above, the servo output rotates counter-clockwise when the signal width is increased.

## Deadband (DB width)

The smaller the deadband, the sooner any corrective activity takes place when an angular change occurs. If the deadband is too low for the application, the result will be increased wear. Increasing the deadband results in loss of precision.

## Travel speed

The servo's transit speed: 100% equates to maximum possible travel speed.

## ID-read / Node-ID

Assignment of an actuator ID in TTL and CAN networks.

## Fail Safe

If the signal is lost, the servo rotates to a pre-selected position.

## Fail Safe limp mode

The servo goes into sleep mode: the motor is disabled and the servo position is not maintained. The servo can be moved by hand.

## Soft Start setting

When switched on, the servo runs to the nominal position at low speed in order to minimise stress on the gearbox and peripherals. At the 100% setting the servo runs to the nominal position with maximum transit speed when switched on.

## Overload protection

Protection mechanism designed to avoid damage to the servo if it is overloaded or stalled. A setting of 20% corresponds to a reduction in maximum torque by 80%.

## Smart sense

An intelligent regulatory circuit adjusts the control parameters while the servo is in use, in order to reduce oscillation. Oscillation can be provoked by fluctuating inertia levels in the various applications.

It is also possible to influence the regulatory circuit manually (sensitivity ratio settings). A high value may result in high-speed oscillation at the servo. A low value may generate severely damped response characteristics.





## SERIES SUMMARY

### HLS-series (Linear Actuators)

Electrical linear actuators generating straight-line travel movements, making them suitable as replacements for pneumatic and hydraulic cylinders in many applications.

### SG-series (Industrial Servos)

The premium industrial servo line, consistently developed for requirements in the fields of automation, unmanned aviation and robotics. Basic equipment includes a powerful BLDC motor, a Hall sensor for zero-contact, zero-wear position sensing, and watertight construction. All SG-series servos also feature a Multi-Turn\* and Continuous-Rotation\*\* function.

### HSB-series (Brushless Servos)

Mid-priced servo motors with powerful BLDC motors.

### HSR-series (Servos with Multi-Turn)

Mid-priced servo motors with Multi-Turn\* and in some cases Continuous-Rotation\*\* function. Most are equipped with a BLDC motor.

### D-series (Digital Servos)

Mid-priced digital servo motors with a coreless or brushed motor. Fitted with a high-quality potentiometer for position sensing.

### MD-series (Digital Servos with Magnetic Encoder)

Mid-priced digital servo motors with a coreless or brushed motor. Fitted with a Hall sensor for position sensing.

### DB-series (Brushless Servos)

Mid-priced digital servo motors with powerful BLDC motors. Fitted with a high-quality potentiometer for position sensing.

### MDB-series (Brushless Servos with Magnetic Encoder)

Mid-priced digital servo motors with powerful BLDC motors. Fitted with a Hall sensor for position sensing.

### MDR-series (Digital Servos with Magnetic Encoder and Multi-Turn)

Mid-priced digital servo motors with Multi-Turn\* and in some cases Continuous-Rotation\*\* function. Fitted with a coreless or brushed motor. Fitted with a Hall sensor for position sensing.

### HS-series (Hitec Servo)

Low-priced analogue servo motors, fitted with a brushed motor and a potentiometer for position sensing.

### HS-1XXX, HS-5XXX, HS-7XXX series (Hitec Servo)

Mid-priced digital servo motors fitted with a coreless or brushed motor and a potentiometer for position sensing.

\*: Several rotations are possible for maximum angular travel.

\*\* : The servo is capable of continuous rotation.

# TWO-WAY COMMUNICATION (FEEDBACK)

## Absolute position

The control system no longer has to rely on an actuator actually taking up the desired position; instead its current position can be read off with a resolution of 4096 steps.

## Torque

Torque is a particularly important feature, as it allows the user to make assessments of the actual loads when the actuator is in use, as well as the condition of the components. Stiff mechanical systems can be detected and corrected in good time before they result in actuator overload. The torque value is derived from the motor PWM, and is therefore not an actual measurement, but it is adequately precise for the majority of applications.

## Speed

How fast is the actuator when actually in use by the application? The actuator itself supplies the answer, thereby permitting important inferences to be drawn for many a control task.

## Power supply voltage

The actuator constantly provides information on the momentary power supply voltage. The development or maintenance team can use this to detect potential weak points in the cable loom, for example: enabling high-resistance connectors to be replaced in good time.

## Current drain

Current is the most important feedback element in preventing potential damage. Rising current over a given period of operation under a constant load is a reliable indication of an imminent fault. This may relate to the motor, the gearbox or the mechanical system being moved. Monitoring current drain opens up new possibilities in programming: effective system life can be extended by targeted optimisation of the internal control system (PID) and other parameters such as Soft Start (ramp) or deadband.

## Micro-controller temperature

The temperature of the micro-controller is more than just a useful piece of information. Environmental conditions which include wide thermal variation can be very demanding on an actuator. Monitoring temperature in this way allows the development team to learn the thermal limits of the product, and to introduce appropriate measures to prevent premature failure.

## Motor temperature

Are you asking too much of the actuator you are using? The motor temperature provides reliable information on whether an actuator is being operated close to its limit. This feedback is very important, especially if thermal conditions are widely variable.

## Cycle counter

How many cycles does the actuator complete during use? How many parts were positioned? When must the actuator be replaced because the maximum cycle count has been reached? Some of our actuators supply this feedback in a convenient manner as part of the protocol.

# MOTORTYPES OVERVIEW

## Brushed Motor

Brushed DC motors are characterized primarily by their low price, but also by their high overload capacity (good heat dissipation). These motors are mainly used in analog servos. They are a first choice for applications with lower performance requirements or a relatively low number of cycles (e.g. locking mechanisms). The disadvantages are, in addition to the wear and tear of the sliders, an increased cogging torque and lower efficiency. The motor ramp-up time (acceleration) is between 22 and 40ms, depending on the type.

## Coreless Motor

These extremely efficient motors (no cyclic magnetization losses) impress with very fast motor ramp-up times (acceleration) of just 7 to 11ms and high power delivery. Due to their design, (iron-)coreless motors have no cogging torque, which is reflected in smooth engine running. The wear is low and relates only to the conductor, which is used for commutation, and the bearings. A disadvantage is the low overload capacity of the coreless design, due to poor heat dissipation. Coreless motors therefore recommended for use in more demanding applications, where there are also occasional rest phases between cycles to allow cooling, or for control and regulation tasks in the low load range.

## Brushless Motor

Powerful BLDC motors combine many advantages of modern drive technology and are almost wear-free (no sliders). In addition to high efficiency and smooth running, sensor-controlled brushless motors also offer a fast motor ramp-up time (acceleration) of just 11 to 14 ms and high torque right from a standing start. In contrast to coreless motors, good heat dissipation is provided via the laminated core, which minimizes thermal problems during continuous operation. These motors are highly recommended for demanding applications with frequent corrective measures. Most high-load actuators are therefore equipped with BLDC motors.





# DMSZ ZERTIFIKAT

Die  
Deutsche Managementsystem Zertifizierungsgesellschaft mbH

bescheinigt hiermit, dass das Unternehmen



Multiplex Modellsport GmbH & Co. KG

Westliche Gewerbestr.1  
75015 Bretten

für den Geltungsbereich

Produktion, Entwicklung und Handel von Flugmodellen, Fernsteuersystemen,  
Aktuatoren sowie Lade-, Antriebs- und Regeltechnologie im  
Modellsport und Industriebereich.

ein

**Qualitätsmanagementsystem**

eingeführt hat und anwendet.

Durch ein Audit, dokumentiert in einem Bericht, wurde der Nachweis erbracht,  
dass dieses Qualitätsmanagementsystem die Forderungen der folgenden Norm erfüllt:

**DIN EN ISO 9001:2015**

Ausgabe November 2015

Dieses Zertifikat ist gültig vom 05.12.2022 bis 04.12.2025

Zertifikat-Registrier-Nr.: QM 22118-Z02443

Griesheim, den 05.12.2022



*D. Kaiser*  
Dietmar Kaiser  
(Geschäftsführer)

*Hans-W. Lortz*  
Hans-Werner Lortz  
(Leiter Zertifizierungsstelle)



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## HLS LINEAR ACTUATORS



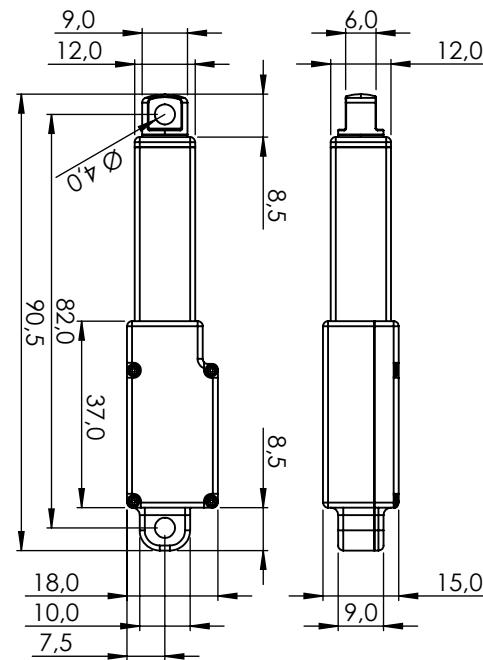
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HLS12-50

HLS12-100

*HLS12-3050, -30100, -30210, -30380*

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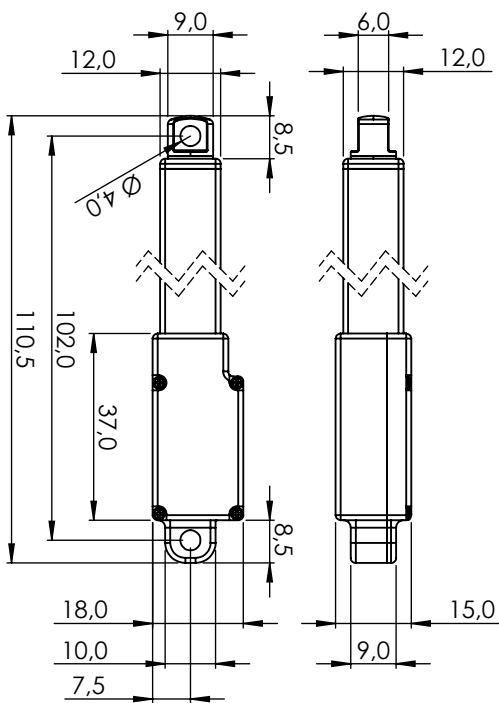
## GENERAL SPECIFICATION

| HLS12-30XXX                |                                     |          |         |                  |          |         |                    |         |         |                    |         |         |
|----------------------------|-------------------------------------|----------|---------|------------------|----------|---------|--------------------|---------|---------|--------------------|---------|---------|
| Control System             | PWM 1000usec ~ 2000usec             |          |         |                  |          |         |                    |         |         |                    |         |         |
| Position Sensor Type       | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Operating Voltage Range    | 4.0 ~ 8.4V                          |          |         |                  |          |         |                    |         |         |                    |         |         |
| Motor Type                 | Cored Metal Brush                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Amplifier / MCU            | 32bits programmable Digital         |          |         |                  |          |         |                    |         |         |                    |         |         |
| Lead Screw                 | Lead 5mm                            |          |         |                  |          |         |                    |         |         |                    |         |         |
| Stroke Option              | 30mm                                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Repeatability              | ±0.2mm                              |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Ratio                 | 50:1                                |          |         | 100:1            |          |         | 210:1              |         |         | 380:1              |         |         |
| Voltage                    | At 7.4V                             |          |         | At 7.4V          |          |         | At 7.4V            |         |         | At 7.4V            |         |         |
| Speed at no Load           | 30.9mm/s                            |          |         | 16.1mm/s         |          |         | 7.5mm/s            |         |         | 4.1mm/s            |         |         |
| Running Current at no Load | 130mA                               |          |         | 130mA            |          |         | 130mA              |         |         | 130mA              |         |         |
| Load Spec                  | Load                                | Speed    | Current | Load             | Speed    | Current | Load               | Speed   | Current | Load               | Speed   | Current |
| Maximum Efficiency Point   | 1.2kg<br>(11.8N)                    | 23.5mm/s | 250mA   | 2.1kg<br>(20.6N) | 12.7mm/s | 250mA   | 4.4kg<br>(43.2N)   | 5.6mm/s | 250mA   | 8.0kg<br>(78.5N)   | 3.1mm/s | 250mA   |
| Peak Power Point           | 2.1kg<br>(20.6N)                    | 17.3mm/s | 370mA   | 3.8kg<br>(37.3N) | 8.6mm/s  | 370mA   | 7.7kg<br>(75.5N)   | 4.0mm/s | 370mA   | 12.4kg<br>(121.6N) | 2.3mm/s | 370mA   |
| Max Force (Lifted)         | 2.7kg<br>(26.5N)                    | 8.2mm/s  | 490mA   | 5.2kg<br>(51.0N) | 4.0mm/s  | 490mA   | 9.9kg<br>(97.1N)   | 2.8mm/s | 490mA   | 14.8kg<br>(145.2N) | 1.5mm/s | 490mA   |
| Stall Torque               | 3.1kg<br>(30.4N)                    |          |         | 6.2kg<br>(60.8N) |          |         | 12.4kg<br>(121.6N) |         |         | 22.2kg<br>(217.8N) |         |         |
| Stall Current              | 620mA                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Static Force           | 25.2kg (247N) (above)               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Side Load (Extended)   | 4.1kg (40N)                         |          |         |                  |          |         |                    |         |         |                    |         |         |
| OperatingTemperatureRange  | -10°C ~ +50°C (14°F ~ +122°F)       |          |         |                  |          |         |                    |         |         |                    |         |         |
| Storage Temperature Range  | -30°C ~ +80°C (-31°F ~ +176°F)      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Vibrations at no Load      | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Length      | 160mm                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Gauge       | 24AWG                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| ConnectorWireStrandCount   | 40/0.08                             |          |         |                  |          |         |                    |         |         |                    |         |         |
| External Dimensions        | 82.0 x 15.0 x 18.0mm                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Weight                     | 34.0g                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Ball Bearing               | Flange Bearing                      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Case Material              | Engineering Plastic & Aluminum Pipe |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Material              | 4 Metal Gears                       |          |         |                  |          |         |                    |         |         |                    |         |         |
| IP-Rating                  | IP4X                                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Revision                   | Rev. 1.1 / 02.01.2024               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Changelog                  | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |



HLS12-5050, -50100, -50210, -50380

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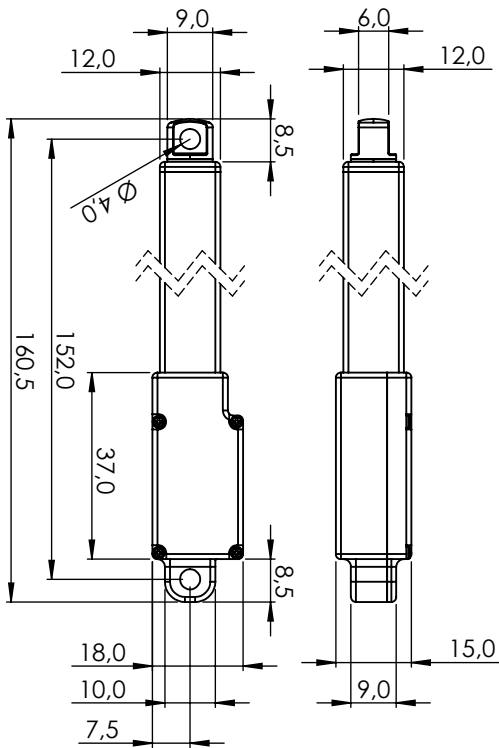
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GENERAL SPECIFICATION

| HLS12-50XXX                |                                     |          |         |                  |          |         |                    |         |         |                    |         |         |
|----------------------------|-------------------------------------|----------|---------|------------------|----------|---------|--------------------|---------|---------|--------------------|---------|---------|
| Control System             | PWM<br>1000usec ~ 2000usec          |          |         |                  |          |         |                    |         |         |                    |         |         |
| Position Sensor Type       | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Operating Voltage Range    | 4.0 ~ 8.4V                          |          |         |                  |          |         |                    |         |         |                    |         |         |
| Motor Type                 | Cored Metal Brush                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Amplifier / MCU            | 32bits programmable Digital         |          |         |                  |          |         |                    |         |         |                    |         |         |
| Lead Screw                 | Lead 5mm                            |          |         |                  |          |         |                    |         |         |                    |         |         |
| Stroke Option              | 50mm                                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Repeatability              | ±0.3mm                              |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Ratio                 | 50:1                                |          |         | 100:1            |          |         | 210:1              |         |         | 380:1              |         |         |
| Voltage                    | At 7.4V                             |          |         | At 7.4V          |          |         | At 7.4V            |         |         | At 7.4V            |         |         |
| Speed at no Load           | 30.9mm/s                            |          |         | 16.1mm/s         |          |         | 7.5mm/s            |         |         | 4.1mm/s            |         |         |
| Running Current at no Load | 130mA                               |          |         | 130mA            |          |         | 130mA              |         |         | 130mA              |         |         |
| Load Spec                  | Load                                | Speed    | Current | Load             | Speed    | Current | Load               | Speed   | Current | Load               | Speed   | Current |
| Maximum Efficiency Point   | 1.2kg<br>(11.8N)                    | 23.5mm/s | 250mA   | 2.1kg<br>(20.6N) | 12.7mm/s | 250mA   | 4.4kg<br>(43.2N)   | 5.6mm/s | 250mA   | 8.0kg<br>(78.5N)   | 3.1mm/s | 250mA   |
| Peak Power Point           | 2.1kg<br>(20.6N)                    | 17.3mm/s | 370mA   | 3.8kg<br>(37.3N) | 8.6mm/s  | 370mA   | 7.7kg<br>(75.5N)   | 4.0mm/s | 370mA   | 12.4kg<br>(121.6N) | 2.3mm/s | 370mA   |
| Max Force (Lifted)         | 2.7kg<br>(26.5N)                    | 8.2mm/s  | 490mA   | 5.2kg<br>(51.0N) | 4.0mm/s  | 490mA   | 9.9kg<br>(97.1N)   | 2.8mm/s | 490mA   | 14.8kg<br>(145.2N) | 1.5mm/s | 490mA   |
| Stall Torque               | 3.1kg<br>(30.4N)                    |          |         | 6.2kg<br>(60.8N) |          |         | 12.4kg<br>(121.6N) |         |         | 22.2kg<br>(217.8N) |         |         |
| Stall Current              | 620mA                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Static Force           | 25.2kg (247N) (above)               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Side Load (Extended)   | 3.1kg (30N)                         |          |         |                  |          |         |                    |         |         |                    |         |         |
| OperatingTemperatureRange  | -10°C ~ +50°C (14°F ~ +122°F)       |          |         |                  |          |         |                    |         |         |                    |         |         |
| Storage Temperature Range  | -30°C ~ +80°C (-31°F ~ +176°F)      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Vibrations at no Load      | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Length      | 160mm                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Gauge       | 24AWG                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| ConnectorWireStrandCount   | 40/0.08                             |          |         |                  |          |         |                    |         |         |                    |         |         |
| External Dimensions        | 102.0 x 15.0 x 18.0mm               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Weight                     | 40.0g                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Ball Bearing               | Flange Bearing                      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Case Material              | Engineering Plastic & Aluminum Pipe |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Material              | 4 Metal Gears                       |          |         |                  |          |         |                    |         |         |                    |         |         |
| IP-Rating                  | IP4X                                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Revision                   | Rev. 1.1 / 02.01.2024               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Changelog                  | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |

HLS12-10050, -100100, -100210, -100380

#1-02496, #1-03234, #1-02460, #1-02461

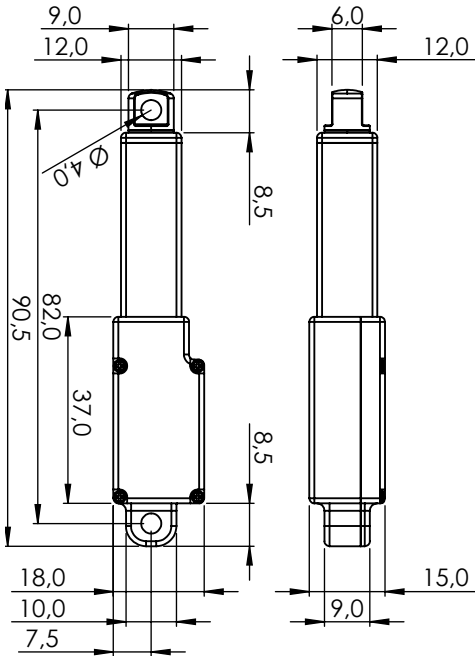


GENERAL SPECIFICATION

| HLS12-100XX                |                                     |          |         |                  |          |         |                    |         |         |                    |         |         |
|----------------------------|-------------------------------------|----------|---------|------------------|----------|---------|--------------------|---------|---------|--------------------|---------|---------|
| Control System             | PWM<br>1000usec ~ 2000usec          |          |         |                  |          |         |                    |         |         |                    |         |         |
| Position Sensor Type       | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Operating Voltage Range    | 4.0 ~ 8.4V                          |          |         |                  |          |         |                    |         |         |                    |         |         |
| Motor Type                 | Cored Metal Brush                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Amplifier / MCU            | 32bits programmable Digital         |          |         |                  |          |         |                    |         |         |                    |         |         |
| Lead Screw                 | Lead 5mm                            |          |         |                  |          |         |                    |         |         |                    |         |         |
| Stroke Option              | 100mm                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Repeatability              | ±0.5mm                              |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Ratio                 | 50:1                                |          |         | 100:1            |          |         | 210:1              |         |         | 380:1              |         |         |
| Voltage                    | At 7.4V                             |          |         | At 7.4V          |          |         | At 7.4V            |         |         | At 7.4V            |         |         |
| Speed at no Load           | 30.9mm/s                            |          |         | 16.1mm/s         |          |         | 7.5mm/s            |         |         | 4.1mm/s            |         |         |
| Running Current at no Load | 130mA                               |          |         | 130mA            |          |         | 130mA              |         |         | 130mA              |         |         |
| Load Spec                  | Load                                | Speed    | Current | Load             | Speed    | Current | Load               | Speed   | Current | Load               | Speed   | Current |
| Maximum Efficiency Point   | 1.2kg<br>(11.8N)                    | 23.5mm/s | 250mA   | 2.1kg<br>(20.6N) | 12.7mm/s | 250mA   | 4.4kg<br>(43.2N)   | 5.6mm/s | 250mA   | 8.0kg<br>(78.5N)   | 3.1mm/s | 250mA   |
| Peak Power Point           | 2.1kg<br>(20.6N)                    | 17.3mm/s | 370mA   | 3.8kg<br>(37.3N) | 8.6mm/s  | 370mA   | 7.7kg<br>(75.5N)   | 4.0mm/s | 370mA   | 12.4kg<br>(121.6N) | 2.3mm/s | 370mA   |
| Max Force (Lifted)         | 2.7kg<br>(26.5N)                    | 8.2mm/s  | 490mA   | 5.2kg<br>(51.0N) | 4.0mm/s  | 490mA   | 9.9kg<br>(97.1N)   | 2.8mm/s | 490mA   | 14.8kg<br>(145.2N) | 1.5mm/s | 490mA   |
| Stall Torque               | 3.1kg<br>(30.4N)                    |          |         | 6.2kg<br>(60.8N) |          |         | 12.4kg<br>(121.6N) |         |         | 22.2kg<br>(217.8N) |         |         |
| Stall Current              | 620mA                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Static Force           | 25.2kg (247N) (above)               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Max Side Load (Extended)   | 1.5kg (15N)                         |          |         |                  |          |         |                    |         |         |                    |         |         |
| OperatingTemperatureRange  | -10°C ~ +50°C (14°F ~ +122°F)       |          |         |                  |          |         |                    |         |         |                    |         |         |
| Storage Temperature Range  | -30°C ~ +80°C (-31°F ~ +176°F)      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Vibrations at no Load      | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Length      | 160mm                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Connector Wire Gauge       | 24AWG                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| ConnectorWireStrandCount   | 40/0.08                             |          |         |                  |          |         |                    |         |         |                    |         |         |
| External Dimensions        | 152.0 x 15.0 x 18.0mm               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Weight                     | 56.0g                               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Ball Bearing               | Flange Bearing                      |          |         |                  |          |         |                    |         |         |                    |         |         |
| Case Material              | Engineering Plastic & Aluminum Pipe |          |         |                  |          |         |                    |         |         |                    |         |         |
| Gear Material              | 4 Metal Gears                       |          |         |                  |          |         |                    |         |         |                    |         |         |
| IP-Rating                  | IP4X                                |          |         |                  |          |         |                    |         |         |                    |         |         |
| Revision                   | Rev. 1.1 / 02.01.2024               |          |         |                  |          |         |                    |         |         |                    |         |         |
| Changelog                  | -                                   |          |         |                  |          |         |                    |         |         |                    |         |         |

HLS12-CAN-3050

# 1-03288



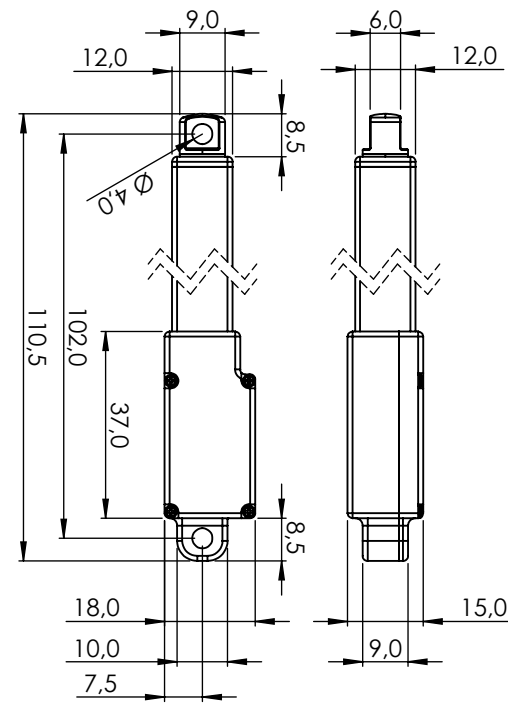
GENERAL SPECIFICATION

| HLS12-CAN-3050                     |                                                              |                 |                 |
|------------------------------------|--------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                   |                 |                 |
| Position Sensor Type               | -                                                            |                 |                 |
| Motor Type                         | Cored Metal Brush                                            |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                 |                 |
| Stroke Option                      | 30mm                                                         |                 |                 |
| Repeatability                      | ±0.2mm                                                       |                 |                 |
| Gear Ratio                         | 50:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                         | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                     | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                         | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                              | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                        | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                               | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                     | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                              | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                     | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                        | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                              | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                      | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA           | 490mA           |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                             |                 |                 |
| Connector Wire Gauge               | 24AWG                                                        |                 |                 |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 34g (1.199oz)                                                |                 |                 |
| Bearing Type                       | Flange bearing                                               |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                 |                 |
| Gear Material                      | 4 Metal Gears                                                |                 |                 |
| IP-Rating                          | IP4X                                                         |                 |                 |



*HLS12-CAN-5050*

# 1-03289

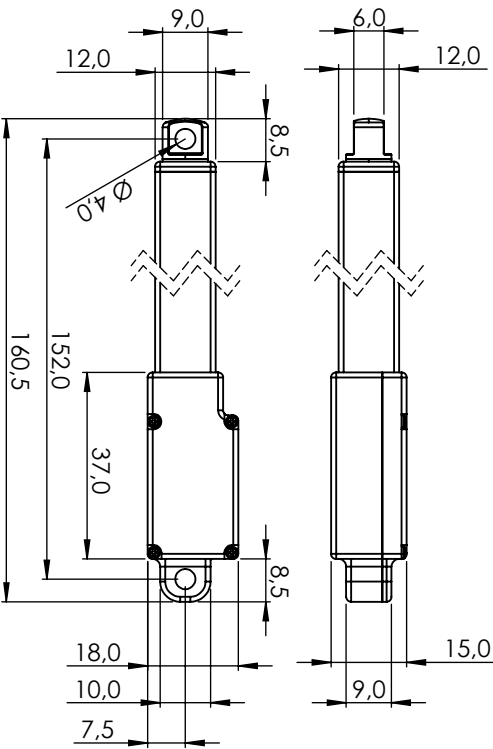


## GENERAL SPECIFICATION

| HLS12-CAN-5050                     |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                    |                 |                 |
| Position Sensor Type               | -                                                             |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 50mm                                                          |                 |                 |
| Repeatability                      | ±0.3mm                                                        |                 |                 |
| Gear Ratio                         | 50:1                                                          |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                      | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                               | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                                | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                      | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                      | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                               | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                       | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 40g (1.411oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-CAN-10050

# 1-03290

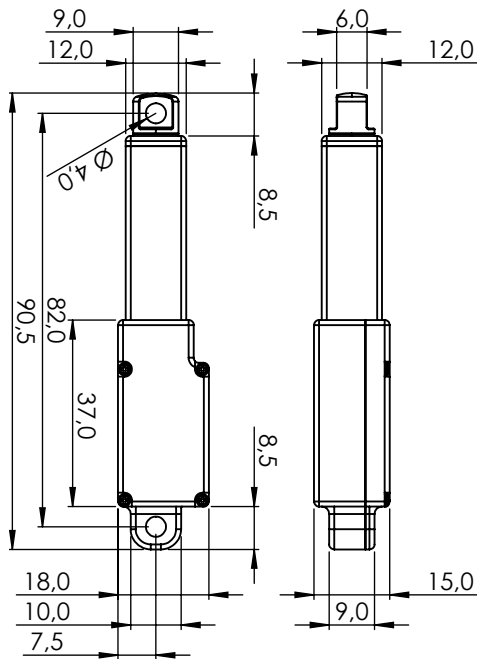


GENERAL SPECIFICATION

| HLS12-CAN-10050                    |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                    |                 |                 |
| Position Sensor Type               | -                                                             |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 100mm                                                         |                 |                 |
| Repeatability                      | ±0.5mm                                                        |                 |                 |
| Gear Ratio                         | 50:1                                                          |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                      | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                               | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                                | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                      | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                      | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                               | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                       | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 56g (1.975oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-CAN-30100

# 1-03291



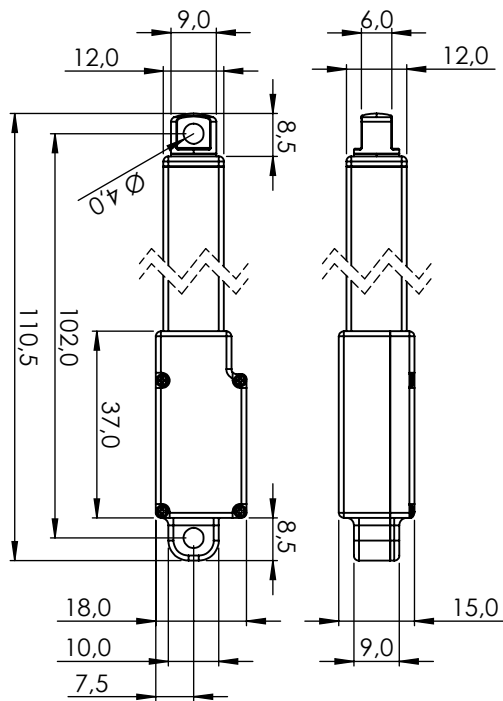
GENERAL SPECIFICATION

| HLS12-CAN-30100                    |                                                              |                 |                 |
|------------------------------------|--------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                   |                 |                 |
| Position Sensor Type               | -                                                            |                 |                 |
| Motor Type                         | Cored Metal Brush                                            |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                 |                 |
| Stroke Option                      | 30mm                                                         |                 |                 |
| Repeatability                      | ±0.2mm                                                       |                 |                 |
| Gear Ratio                         | 100:1                                                        |                 |                 |
| Voltage                            | 4.8V                                                         | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                     | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                         | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                              | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                        | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                              | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                      | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                              | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                      | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                        | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                              | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                      | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA           | 490mA           |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                             |                 |                 |
| Connector Wire Gauge               | 24AWG                                                        |                 |                 |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 34g (1.199oz)                                                |                 |                 |
| Bearing Type                       | Flange bearing                                               |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                 |                 |
| Gear Material                      | 4 Metal Gears                                                |                 |                 |
| IP-Rating                          | IP4X                                                         |                 |                 |



HLS12-CAN-50100

# 1-03292

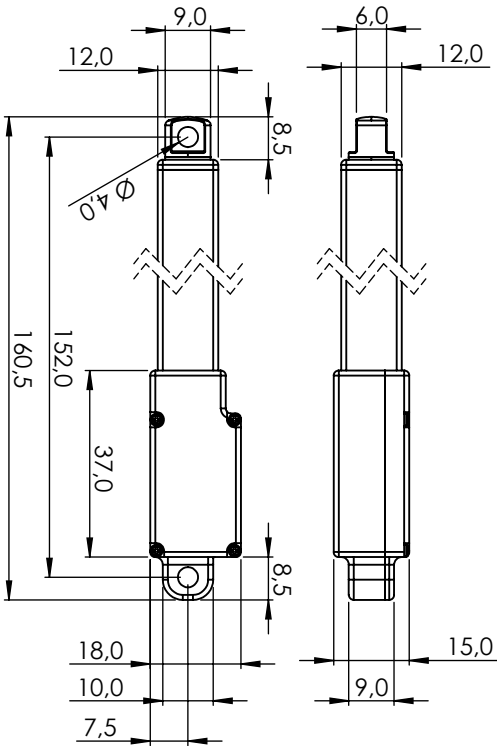


GENERAL SPECIFICATION

| HLS12-CAN-50100                    |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                    |                 |                 |
| Position Sensor Type               | -                                                             |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 50mm                                                          |                 |                 |
| Repeatability                      | ±0.3mm                                                        |                 |                 |
| Gear Ratio                         | 100:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                      | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                               | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                       | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                               | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                       | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                               | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                       | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 40g (1.411oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-CAN-100100

# 1-03293

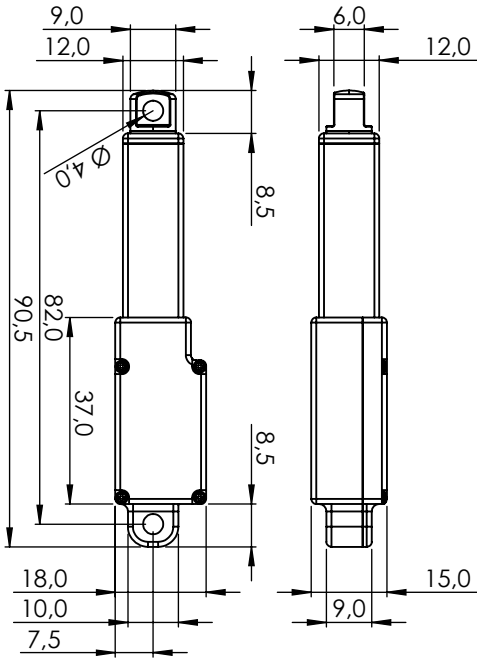


GENERAL SPECIFICATION

| HLS12-CAN-100100                   |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | CAN2.0A, B                                                    |                 |                 |
| Position Sensor Type               | -                                                             |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 100mm                                                         |                 |                 |
| Repeatability                      | ±0.5mm                                                        |                 |                 |
| Gear Ratio                         | 100:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                      | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                               | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                       | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                               | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                       | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                               | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                       | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 56g (1.975oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-CAN-30210

# 1-03294



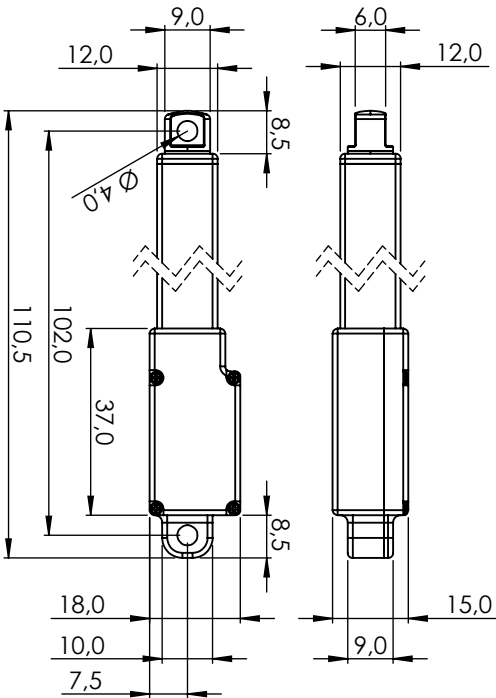
GENERAL SPECIFICATION

| HLS12-CAN-30210                    |                                                              |                  |                   |
|------------------------------------|--------------------------------------------------------------|------------------|-------------------|
| Control System                     | CAN2.0A, B                                                   |                  |                   |
| Position Sensor Type               | -                                                            |                  |                   |
| Motor Type                         | Cored Metal Brush                                            |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                  |                   |
| Stroke Option                      | 30mm                                                         |                  |                   |
| Repeatability                      | ±0.2mm                                                       |                  |                   |
| Gear Ratio                         | 210:1                                                        |                  |                   |
| Voltage                            | 4.8V                                                         | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                      | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                         | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                              | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                        | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                              | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                      | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                              | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                      | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                        | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                              | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                      | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA            | 490mA             |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                             |                  |                   |
| Connector Wire Gauge               | 24AWG                                                        |                  |                   |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 34g (1.199oz)                                                |                  |                   |
| Bearing Type                       | Flange bearing                                               |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                  |                   |
| Gear Material                      | 4 Metal Gears                                                |                  |                   |
| IP-Rating                          | IP4X                                                         |                  |                   |



HLS12-CAN-50210

# 1-03295

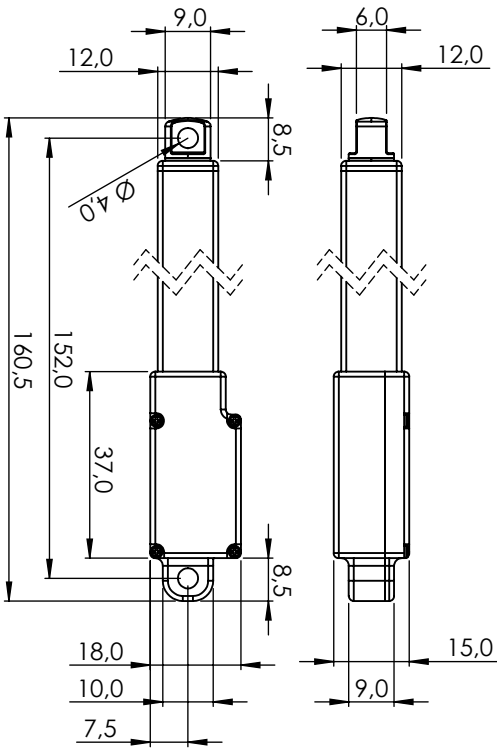


GENERAL SPECIFICATION

| HLS12-CAN-50210                    |                                                               |                  |                   |
|------------------------------------|---------------------------------------------------------------|------------------|-------------------|
| Control System                     | CAN2.0A, B                                                    |                  |                   |
| Position Sensor Type               | -                                                             |                  |                   |
| Motor Type                         | Cored Metal Brush                                             |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                  |                   |
| Stroke Option                      | 50mm                                                          |                  |                   |
| Repeatability                      | ±0.3mm                                                        |                  |                   |
| Gear Ratio                         | 210:1                                                         |                  |                   |
| Voltage                            | 4.8V                                                          | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                       | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                         | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                               | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                       | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                               | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                       | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                               | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                       | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA            | 490mA             |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                  |                   |
| Connector Wire Gauge               | 24AWG                                                         |                  |                   |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 40g (1.411oz)                                                 |                  |                   |
| Bearing Type                       | Flange bearing                                                |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                  |                   |
| Gear Material                      | 4 Metal Gears                                                 |                  |                   |
| IP-Rating                          | IP4X                                                          |                  |                   |

HLS12-CAN-100210

# 1-03296

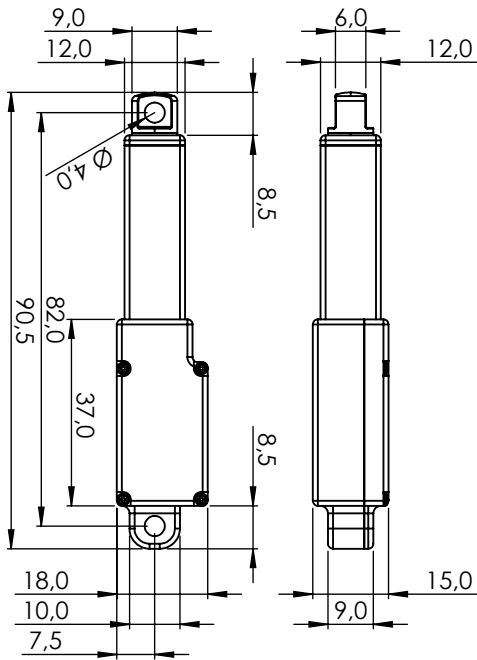


GENERAL SPECIFICATION

| HLS12-CAN-100210                   |                                                               |                  |                   |
|------------------------------------|---------------------------------------------------------------|------------------|-------------------|
| Control System                     | CAN2.0A, B                                                    |                  |                   |
| Position Sensor Type               | -                                                             |                  |                   |
| Motor Type                         | Cored Metal Brush                                             |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                  |                   |
| Stroke Option                      | 100mm                                                         |                  |                   |
| Repeatability                      | ±0.5mm                                                        |                  |                   |
| Gear Ratio                         | 210:1                                                         |                  |                   |
| Voltage                            | 4.8V                                                          | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                       | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                         | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                               | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                       | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                               | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                       | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                               | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                       | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA            | 490mA             |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                  |                   |
| Connector Wire Gauge               | 24AWG                                                         |                  |                   |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 56g (1.975oz)                                                 |                  |                   |
| Bearing Type                       | Flange bearing                                                |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                  |                   |
| Gear Material                      | 4 Metal Gears                                                 |                  |                   |
| IP-Rating                          | IP4X                                                          |                  |                   |

HLS12-CAN-30380

# 1-03297

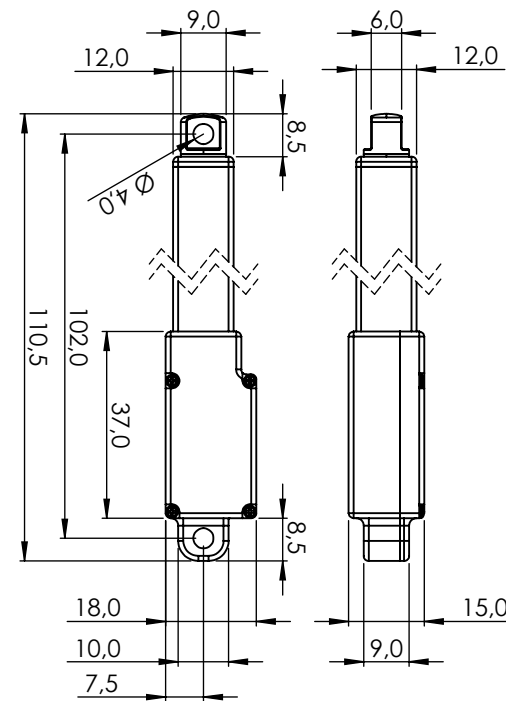


GENERAL SPECIFICATION

| HLS12-CAN-30380                    |                                                              |                   |                   |
|------------------------------------|--------------------------------------------------------------|-------------------|-------------------|
| Control System                     | CAN2.0A, B                                                   |                   |                   |
| Position Sensor Type               | -                                                            |                   |                   |
| Motor Type                         | Cored Metal Brush                                            |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                   |                   |
| Stroke Option                      | 30mm                                                         |                   |                   |
| Repeatability                      | ±0.2mm                                                       |                   |                   |
| Gear Ratio                         | 380:1                                                        |                   |                   |
| Voltage                            | 4.8V                                                         | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                      | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                         | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                            | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                        | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                              | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                      | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                              | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                      | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                        | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                              | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                      | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA             | 490mA             |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                             |                   |                   |
| Connector Wire Gauge               | 24AWG                                                        |                   |                   |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 34g (1.199oz)                                                |                   |                   |
| Bearing Type                       | Flange bearing                                               |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                   |                   |
| Gear Material                      | 4 Metal Gears                                                |                   |                   |
| IP-Rating                          | IP4X                                                         |                   |                   |

*HLS12-CAN-50380*

# 1-03298



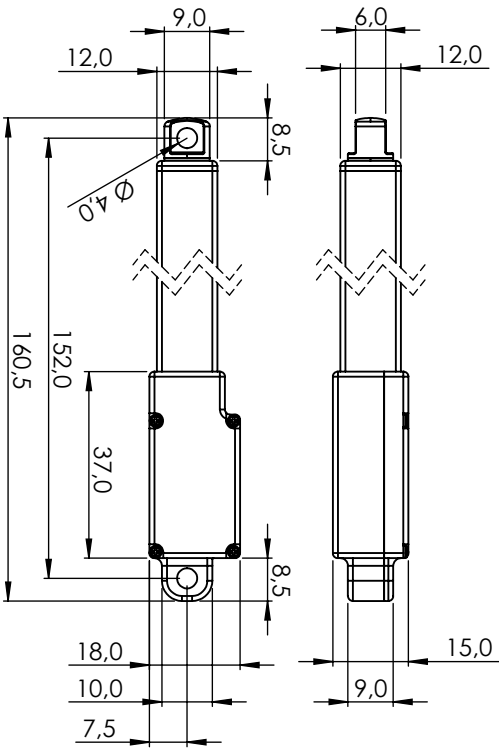
## GENERAL SPECIFICATION

| HLS12-CAN-50380                    |                                                               |                   |                   |
|------------------------------------|---------------------------------------------------------------|-------------------|-------------------|
| Control System                     | CAN2.0A, B                                                    |                   |                   |
| Position Sensor Type               | -                                                             |                   |                   |
| Motor Type                         | Cored Metal Brush                                             |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                   |                   |
| Stroke Option                      | 50mm                                                          |                   |                   |
| Repeatability                      | ±0.3mm                                                        |                   |                   |
| Gear Ratio                         | 380:1                                                         |                   |                   |
| Voltage                            | 4.8V                                                          | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                       | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                             | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                         | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                               | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                       | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                       | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                               | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                       | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA             | 490mA             |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                   |                   |
| Connector Wire Gauge               | 24AWG                                                         |                   |                   |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 40g (1.411oz)                                                 |                   |                   |
| Bearing Type                       | Flange bearing                                                |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                   |                   |
| Gear Material                      | 4 Metal Gears                                                 |                   |                   |
| IP-Rating                          | IP4X                                                          |                   |                   |



HLS12-CAN-100380

# 1-03299

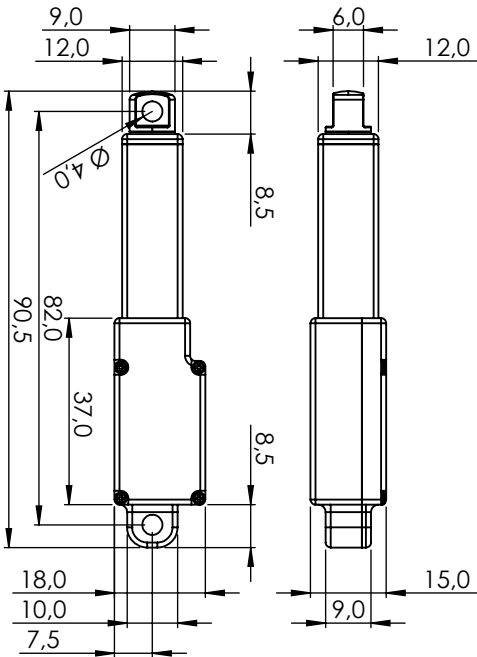


GENERAL SPECIFICATION

| HLS12-CAN-100380                   |                                                               |                   |                   |
|------------------------------------|---------------------------------------------------------------|-------------------|-------------------|
| Control System                     | CAN2.0A, B                                                    |                   |                   |
| Position Sensor Type               | -                                                             |                   |                   |
| Motor Type                         | Cored Metal Brush                                             |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                   |                   |
| Stroke Option                      | 100mm                                                         |                   |                   |
| Repeatability                      | ±0.5mm                                                        |                   |                   |
| Gear Ratio                         | 380:1                                                         |                   |                   |
| Voltage                            | 4.8V                                                          | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                       | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                             | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                         | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                               | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                       | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                       | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                               | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                       | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA             | 490mA             |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                   |                   |
| Connector Wire Gauge               | 24AWG                                                         |                   |                   |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 56g (1.975oz)                                                 |                   |                   |
| Bearing Type                       | Flange bearing                                                |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                   |                   |
| Gear Material                      | 4 Metal Gears                                                 |                   |                   |
| IP-Rating                          | IP4X                                                          |                   |                   |

HLS12-RS485-3050

# 1-03301

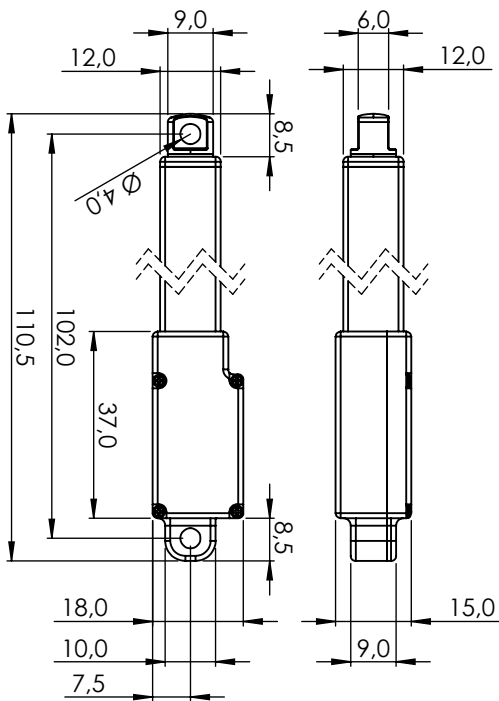


GENERAL SPECIFICATION

| HLS12-RS485-3050                   |                                                              |                 |                 |
|------------------------------------|--------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                        |                 |                 |
| Motor Type                         | Cored Metal Brush                                            |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                 |                 |
| Stroke Option                      | 30mm                                                         |                 |                 |
| Repeatability                      | ±0.2mm                                                       |                 |                 |
| Gear Ratio                         | 50:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                         | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                     | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                         | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                              | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                        | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                               | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                     | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                              | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                     | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                        | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                              | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                      | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA           | 490mA           |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                             |                 |                 |
| Connector Wire Gauge               | 24AWG                                                        |                 |                 |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 34g (1.199oz)                                                |                 |                 |
| Bearing Type                       | Flange bearing                                               |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                 |                 |
| Gear Material                      | 4 Metal Gears                                                |                 |                 |
| IP-Rating                          | IP4X                                                         |                 |                 |

HLS12-RS485-5050

# 1-03302

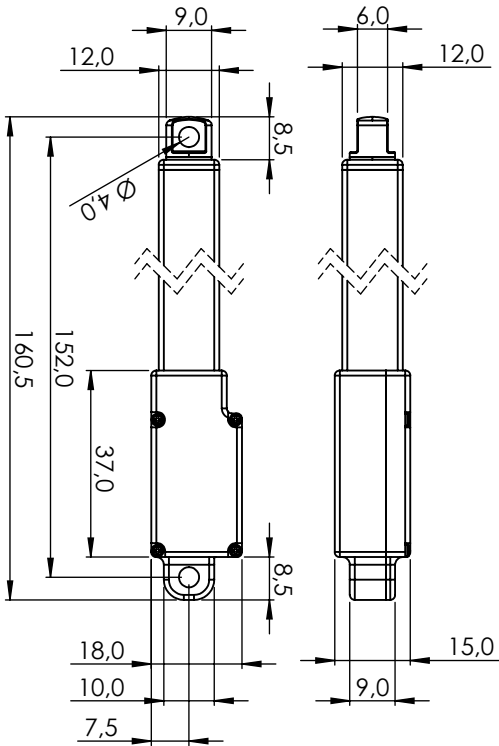


GENERAL SPECIFICATION

| HLS12-RS485-5050                   |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                         |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 50mm                                                          |                 |                 |
| Repeatability                      | ±0.3mm                                                        |                 |                 |
| Gear Ratio                         | 50:1                                                          |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                      | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                               | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                                | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                      | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                      | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                               | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                       | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 40g (1.411oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-RS485-10050

# 1-03303



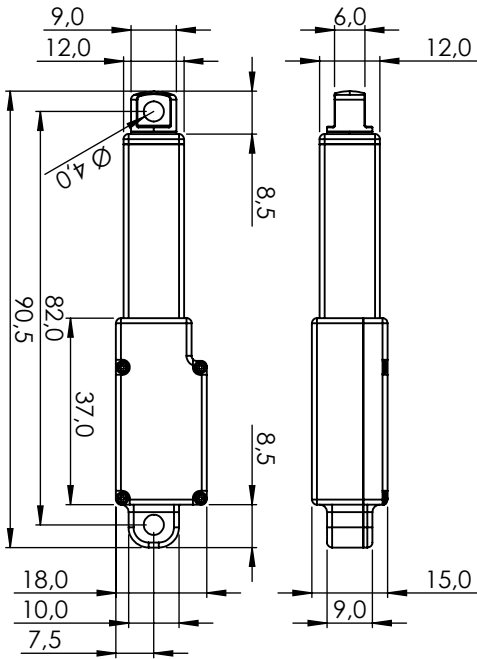
GENERAL SPECIFICATION

| HLS12-RS485-10050                  |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                         |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 100mm                                                         |                 |                 |
| Repeatability                      | ±0.5mm                                                        |                 |                 |
| Gear Ratio                         | 50:1                                                          |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 20.0mm/s                                                      | 25.0mm/s        | 30.9mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 2.0kgf (19.61N)                                               | 2.5kgf (24.52N) | 3.1kgf (30.40N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 0.8kgf (7.85N)                                                | 1.0kgf (9.81N)  | 1.2kgf (11.77N) |
| Maximum Efficiency Point   Speed   | 15.2mm/s                                                      | 19.0mm/s        | 23.5mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Peak Power Point   Speed           | 11.2mm/s                                                      | 14.0mm/s        | 17.3mm/s        |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 1.8kgf (17.65N)                                               | 2.2kgf (21.57N) | 2.7kgf (26.48N) |
| Max Force (Lifted)   Speed         | 5.3mm/s                                                       | 6.7mm/s         | 8.2mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 56g (1.975oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |



HLS12-RS485-30100

# 1-03304

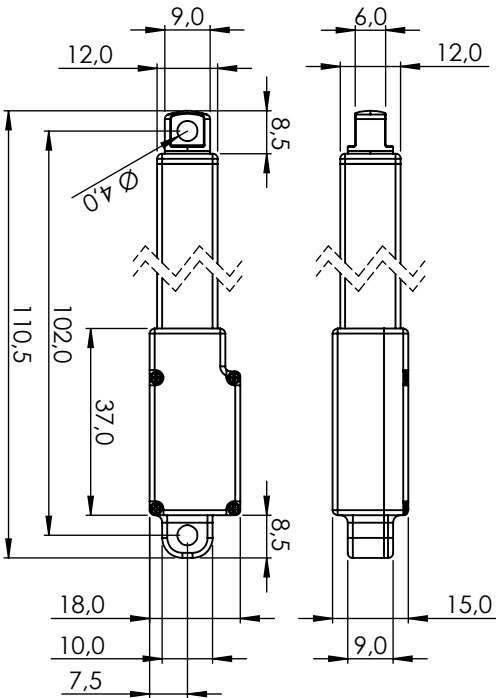


GENERAL SPECIFICATION

| HLS12-RS485-30100                  |                                                              |                 |                 |
|------------------------------------|--------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                        |                 |                 |
| Motor Type                         | Cored Metal Brush                                            |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                 |                 |
| Stroke Option                      | 30mm                                                         |                 |                 |
| Repeatability                      | ±0.2mm                                                       |                 |                 |
| Gear Ratio                         | 100:1                                                        |                 |                 |
| Voltage                            | 4.8V                                                         | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                     | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                         | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                              | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                        | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                              | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                      | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                              | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                      | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                        | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                              | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                      | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA           | 490mA           |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                             |                 |                 |
| Connector Wire Gauge               | 24AWG                                                        |                 |                 |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 34g (1.199oz)                                                |                 |                 |
| Bearing Type                       | Flange bearing                                               |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                 |                 |
| Gear Material                      | 4 Metal Gears                                                |                 |                 |
| IP-Rating                          | IP4X                                                         |                 |                 |

HLS12-RS485-50100

# 1-03305

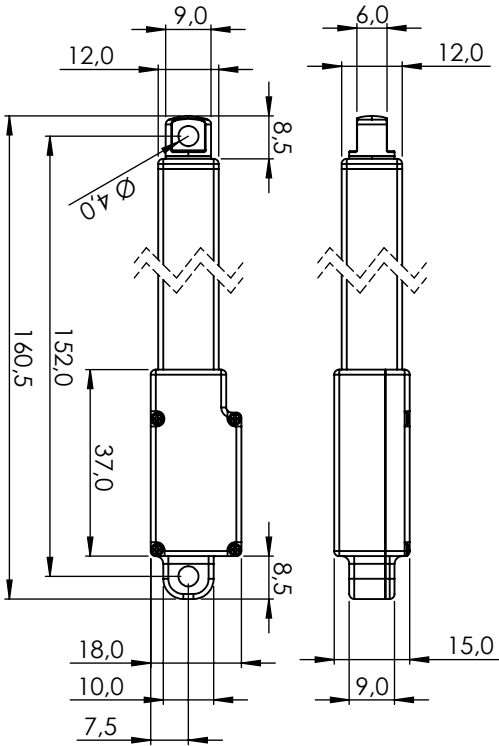


GENERAL SPECIFICATION

| HLS12-RS485-50100                  |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                         |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 50mm                                                          |                 |                 |
| Repeatability                      | ±0.3mm                                                        |                 |                 |
| Gear Ratio                         | 100:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                      | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                               | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                       | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                               | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                       | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                               | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                       | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 40g (1.411oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-RS485-100100

# 1-03306

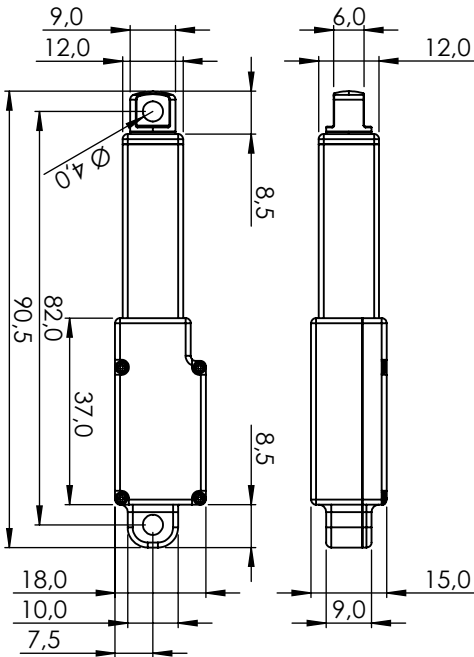


GENERAL SPECIFICATION

| HLS12-RS485-100100                 |                                                               |                 |                 |
|------------------------------------|---------------------------------------------------------------|-----------------|-----------------|
| Control System                     | RS485                                                         |                 |                 |
| Motor Type                         | Cored Metal Brush                                             |                 |                 |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                 |                 |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                 |                 |
| Stroke Option                      | 100mm                                                         |                 |                 |
| Repeatability                      | ±0.5mm                                                        |                 |                 |
| Gear Ratio                         | 100:1                                                         |                 |                 |
| Voltage                            | 4.8V                                                          | 6.0V            | 7.4V            |
| Speed at no Load                   | 10.4mm/s                                                      | 13.0mm/s        | 16.1mm/s        |
| Running Current at no Load         | 80mA                                                          | 100mA           | 130mA           |
| Stall Force                        | 4.0kgf (39.23N)                                               | 5.0kgf (49.03N) | 6.2kgf (60.80N) |
| Stall Current                      | 400mA                                                         | 500mA           | 620mA           |
| Maximum Efficiency Point   Load    | 1.4kgf (13.73N)                                               | 1.7kgf (16.67N) | 2.1kgf (20.59N) |
| Maximum Efficiency Point   Speed   | 8.2mm/s                                                       | 10.3mm/s        | 12.7mm/s        |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA           | 250mA           |
| Peak Power Point   Load            | 2.5kgf (24.52N)                                               | 3.1kgf (30.40N) | 3.8kgf (37.27N) |
| Peak Power Point   Speed           | 5.6mm/s                                                       | 7.0mm/s         | 8.6mm/s         |
| Peak Power Point   Current         | 240mA                                                         | 300mA           | 370mA           |
| Max Force (Lifted)   Load          | 3.2kgf (31.38N)                                               | 4.2kgf (41.19N) | 5.2kgf (50.99N) |
| Max Force (Lifted)   Speed         | 2.6mm/s                                                       | 3.2mm/s         | 4.0mm/s         |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA           | 490mA           |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                 |                 |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                 |                 |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                 |                 |
| Connector Wire Length              | 160mm(6.294inch)                                              |                 |                 |
| Connector Wire Gauge               | 24AWG                                                         |                 |                 |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                 |                 |
| Weight                             | 56g (1.975oz)                                                 |                 |                 |
| Bearing Type                       | Flange bearing                                                |                 |                 |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                 |                 |
| Gear Material                      | 4 Metal Gears                                                 |                 |                 |
| IP-Rating                          | IP4X                                                          |                 |                 |

HLS12-RS485-30210

# 1-03307



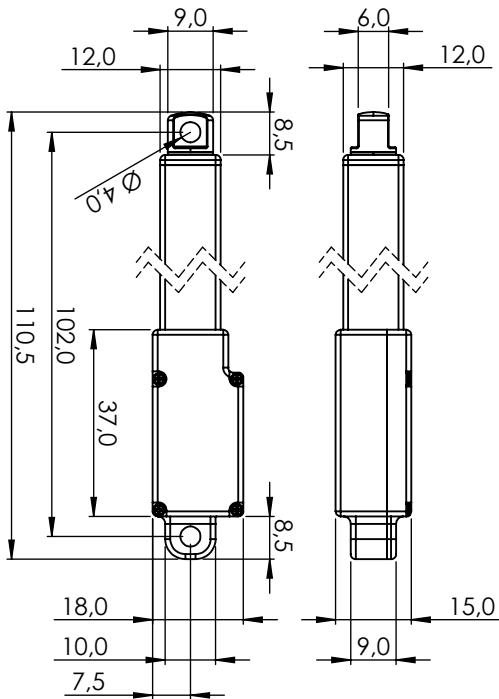
GENERAL SPECIFICATION

| HLS12-RS485-30210                  |                                                              |                  |                   |
|------------------------------------|--------------------------------------------------------------|------------------|-------------------|
| Control System                     | RS485                                                        |                  |                   |
| Motor Type                         | Cored Metal Brush                                            |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                  |                   |
| Stroke Option                      | 30mm                                                         |                  |                   |
| Repeatability                      | ±0.2mm                                                       |                  |                   |
| Gear Ratio                         | 210:1                                                        |                  |                   |
| Voltage                            | 4.8V                                                         | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                      | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                         | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                              | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                        | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                              | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                      | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                              | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                      | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                        | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                              | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                      | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA            | 490mA             |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                             |                  |                   |
| Connector Wire Gauge               | 24AWG                                                        |                  |                   |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 34g (1.199oz)                                                |                  |                   |
| Bearing Type                       | Flange bearing                                               |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                  |                   |
| Gear Material                      | 4 Metal Gears                                                |                  |                   |
| IP-Rating                          | IP4X                                                         |                  |                   |



HLS12-RS485-50210

# 1-03308

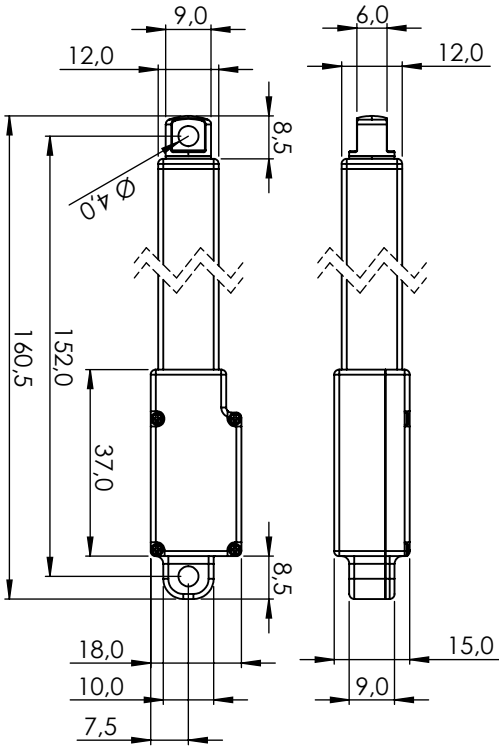


GENERAL SPECIFICATION

| HLS12-RS485-50210                  |                                                               |                  |                   |
|------------------------------------|---------------------------------------------------------------|------------------|-------------------|
| Control System                     | RS485                                                         |                  |                   |
| Motor Type                         | Cored Metal Brush                                             |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                  |                   |
| Stroke Option                      | 50mm                                                          |                  |                   |
| Repeatability                      | ±0.3mm                                                        |                  |                   |
| Gear Ratio                         | 210:1                                                         |                  |                   |
| Voltage                            | 4.8V                                                          | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                       | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                         | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                               | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                       | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                               | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                       | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                               | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                       | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA            | 490mA             |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                  |                   |
| Connector Wire Gauge               | 24AWG                                                         |                  |                   |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 40g (1.411oz)                                                 |                  |                   |
| Bearing Type                       | Flange bearing                                                |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                  |                   |
| Gear Material                      | 4 Metal Gears                                                 |                  |                   |
| IP-Rating                          | IP4X                                                          |                  |                   |

HLS12-RS485-100210

# 1-03309

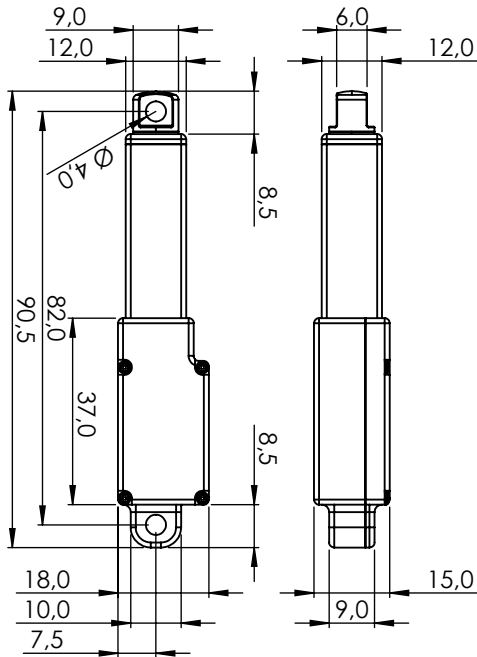


GENERAL SPECIFICATION

| HLS12-RS485-100210                 |                                                               |                  |                   |
|------------------------------------|---------------------------------------------------------------|------------------|-------------------|
| Control System                     | RS485                                                         |                  |                   |
| Motor Type                         | Cored Metal Brush                                             |                  |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                  |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                  |                   |
| Stroke Option                      | 100mm                                                         |                  |                   |
| Repeatability                      | ±0.5mm                                                        |                  |                   |
| Gear Ratio                         | 210:1                                                         |                  |                   |
| Voltage                            | 4.8V                                                          | 6.0V             | 7.4V              |
| Speed at no Load                   | 4.9mm/s                                                       | 6.1mm/s          | 7.5mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA            | 130mA             |
| Stall Force                        | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N) | 12.4kgf (121.60N) |
| Stall Current                      | 400mA                                                         | 500mA            | 620mA             |
| Maximum Efficiency Point   Load    | 2.9kgf (28.44N)                                               | 3.6kgf (35.30N)  | 4.4kgf (43.15N)   |
| Maximum Efficiency Point   Speed   | 3.6mm/s                                                       | 4.5mm/s          | 5.6mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA            | 250mA             |
| Peak Power Point   Load            | 5.6kgf (54.92N)                                               | 7.0kgf (68.65N)  | 8.6kgf (84.34N)   |
| Peak Power Point   Speed           | 2.6mm/s                                                       | 3.2mm/s          | 4.0mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA            | 370mA             |
| Max Force (Lifted)   Load          | 6.4kgf (62.76N)                                               | 8.0kgf (78.45N)  | 9.9kgf (97.09N)   |
| Max Force (Lifted)   Speed         | 1.8mm/s                                                       | 2.3mm/s          | 2.8mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA            | 490mA             |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                  |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                  |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                  |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                  |                   |
| Connector Wire Gauge               | 24AWG                                                         |                  |                   |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                  |                   |
| Weight                             | 56g (1.975oz)                                                 |                  |                   |
| Bearing Type                       | Flange bearing                                                |                  |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                  |                   |
| Gear Material                      | 4 Metal Gears                                                 |                  |                   |
| IP-Rating                          | IP4X                                                          |                  |                   |

HLS12-RS485-30380

# 1-03310

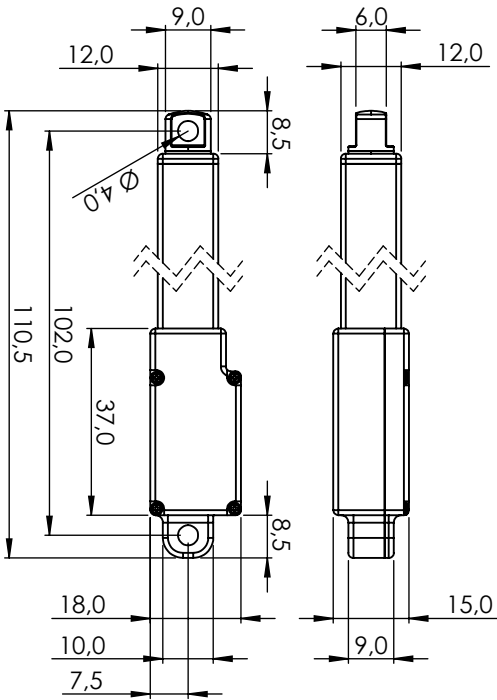


GENERAL SPECIFICATION

| HLS12-RS485-30380                  |                                                              |                   |                   |
|------------------------------------|--------------------------------------------------------------|-------------------|-------------------|
| Control System                     | RS485                                                        |                   |                   |
| Motor Type                         | Cored Metal Brush                                            |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                   |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                   |                   |                   |
| Stroke Option                      | 30mm                                                         |                   |                   |
| Repeatability                      | ±0.2mm                                                       |                   |                   |
| Gear Ratio                         | 380:1                                                        |                   |                   |
| Voltage                            | 4.8V                                                         | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                      | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                         | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                            | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                        | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                              | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                      | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                        | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                              | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                      | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                        | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                              | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                      | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                        | 400mA             | 490mA             |
| Max Side Load (Extended)           | 4.08kgf (40N)                                                |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                             |                   |                   |
| Connector Wire Gauge               | 24AWG                                                        |                   |                   |
| Outline Dimensions                 | 82.0mm x 15.0mm x 18.0mm (3.228inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 34g (1.199oz)                                                |                   |                   |
| Bearing Type                       | Flange bearing                                               |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                          |                   |                   |
| Gear Material                      | 4 Metal Gears                                                |                   |                   |
| IP-Rating                          | IP4X                                                         |                   |                   |

HLS12-RS485-50380

# 1-03311

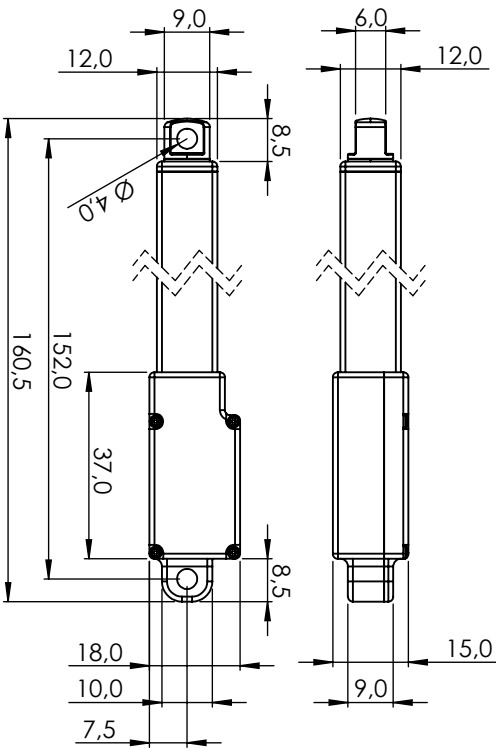


GENERAL SPECIFICATION

| HLS12-RS485-50380                  |                                                               |                   |                   |
|------------------------------------|---------------------------------------------------------------|-------------------|-------------------|
| Control System                     | RS485                                                         |                   |                   |
| Motor Type                         | Cored Metal Brush                                             |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                   |                   |
| Stroke Option                      | 50mm                                                          |                   |                   |
| Repeatability                      | ±0.3mm                                                        |                   |                   |
| Gear Ratio                         | 380:1                                                         |                   |                   |
| Voltage                            | 4.8V                                                          | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                       | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                             | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                         | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                               | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                       | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                       | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                               | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                       | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA             | 490mA             |
| Max Side Load (Extended)           | 3.06kgf (30N)                                                 |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                   |                   |
| Connector Wire Gauge               | 24AWG                                                         |                   |                   |
| Outline Dimensions                 | 102.0mm x 15.0mm x 18.0mm (4.016inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 40g (1.411oz)                                                 |                   |                   |
| Bearing Type                       | Flange bearing                                                |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                   |                   |
| Gear Material                      | 4 Metal Gears                                                 |                   |                   |
| IP-Rating                          | IP4X                                                          |                   |                   |

HLS12-RS485-100380

# 1-03312



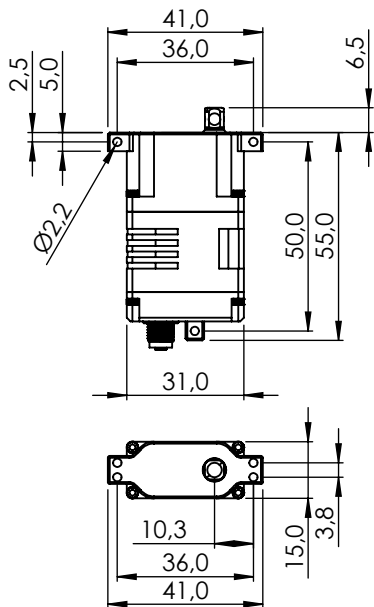
GENERAL SPECIFICATION

| HLS12-RS485-100380                 |                                                               |                   |                   |
|------------------------------------|---------------------------------------------------------------|-------------------|-------------------|
| Control System                     | RS485                                                         |                   |                   |
| Motor Type                         | Cored Metal Brush                                             |                   |                   |
| Operating Voltage Range            | 4.0 ~ 8.4V                                                    |                   |                   |
| Servo Amplifier Type               | 32bit programmable Digital                                    |                   |                   |
| Stroke Option                      | 100mm                                                         |                   |                   |
| Repeatability                      | ±0.5mm                                                        |                   |                   |
| Gear Ratio                         | 380:1                                                         |                   |                   |
| Voltage                            | 4.8V                                                          | 6.0V              | 7.4V              |
| Speed at no Load                   | 2.6mm/s                                                       | 3.3mm/s           | 4.1mm/s           |
| Running Current at no Load         | 80mA                                                          | 100mA             | 130mA             |
| Stall Force                        | 14.4kgf (141.22N)                                             | 18.0kgf (176.52N) | 22.2kgf (217.71N) |
| Stall Current                      | 400mA                                                         | 500mA             | 620mA             |
| Maximum Efficiency Point   Load    | 5.2kgf (50.99N)                                               | 6.5kgf (63.74N)   | 8.0kgf (78.45N)   |
| Maximum Efficiency Point   Speed   | 2.0mm/s                                                       | 2.5mm/s           | 3.1mm/s           |
| Maximum Efficiency Point   Current | 160mA                                                         | 200mA             | 250mA             |
| Peak Power Point   Load            | 8.0kgf (78.45N)                                               | 10.0kgf (98.07N)  | 12.4kgf (121.60N) |
| Peak Power Point   Speed           | 1.5mm/s                                                       | 1.9mm/s           | 2.3mm/s           |
| Peak Power Point   Current         | 240mA                                                         | 300mA             | 370mA             |
| Max Force (Lifted)   Load          | 9.6kgf (94.14N)                                               | 12.0kgf (117.68N) | 14.8kgf (145.14N) |
| Max Force (Lifted)   Speed         | 1.0mm/s                                                       | 1.2mm/s           | 1.5mm/s           |
| Max Force (Lifted)   Current       | 320mA                                                         | 400mA             | 490mA             |
| Max Side Load (Extended)           | 1.53kgf (15N)                                                 |                   |                   |
| Operating Temperature Range        | -10°C ~ +50°C                                                 |                   |                   |
| Storage Temperature Range          | -30°C ~ +80°C                                                 |                   |                   |
| Connector Wire Length              | 160mm(6.294inch)                                              |                   |                   |
| Connector Wire Gauge               | 24AWG                                                         |                   |                   |
| Outline Dimensions                 | 152.0mm x 15.0mm x 18.0mm (5.984inch x 0.591inch x 0.709inch) |                   |                   |
| Weight                             | 56g (1.975oz)                                                 |                   |                   |
| Bearing Type                       | Flange bearing                                                |                   |                   |
| Case Material                      | Engineering Plastic & Aluminum Pipe                           |                   |                   |
| Gear Material                      | 4 Metal Gears                                                 |                   |                   |
| IP-Rating                          | IP4X                                                          |                   |                   |



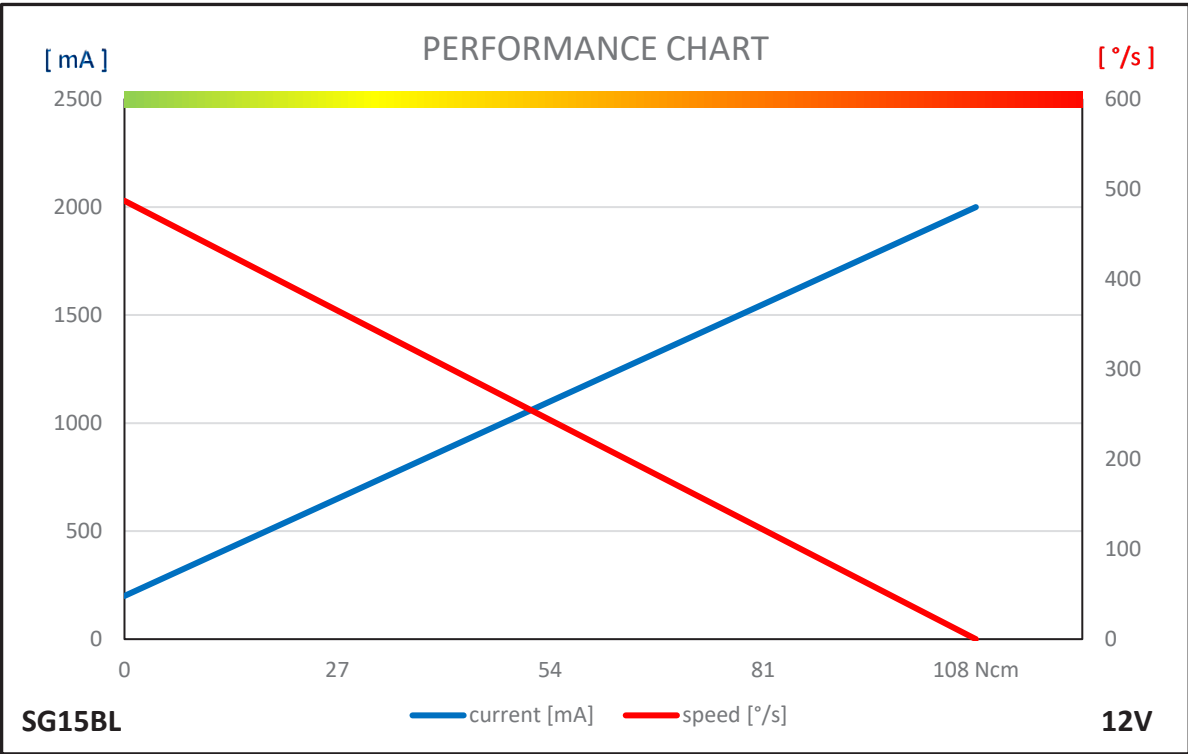
SG15BL-CAN (M5 CIRCULAR)

#1-03282



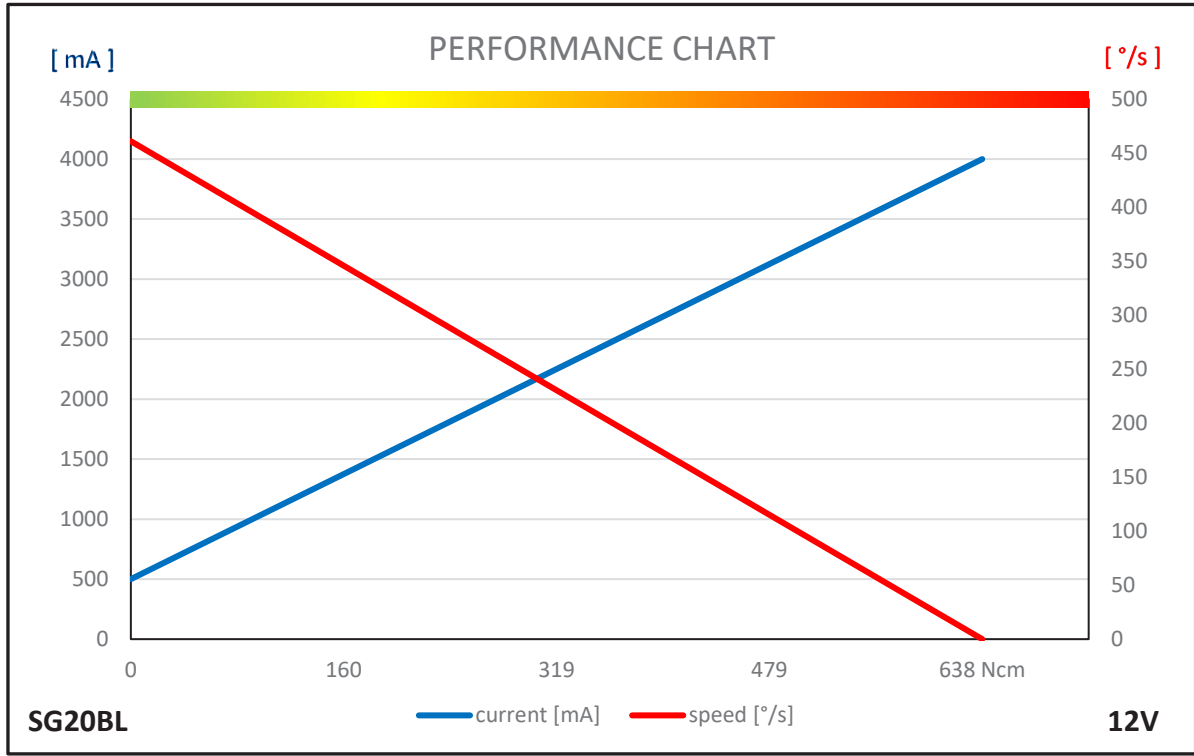
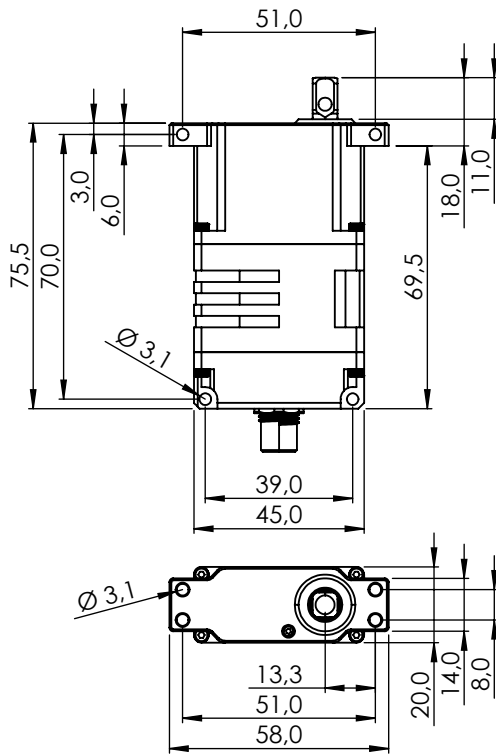
GENERAL SPECIFICATION

| SG15BL-CAN (M5 Circular)     |                                                              |               |          |
|------------------------------|--------------------------------------------------------------|---------------|----------|
| Control System               | CAN 2.0A,B / DroneCAN (UAVCAN v0)                            |               |          |
| Position Sensor Type         | Contactless Magnetic Encoder                                 |               |          |
| Motor Type                   | BLDC                                                         |               |          |
| Operating Voltage Range      | 9.0V ~ 15.0V                                                 |               |          |
| Voltage                      | At 12.0V                                                     |               |          |
| No Load Speed                | 487.8 °/sec                                                  | 0.123 sec/60° | 81.3 RPM |
| Rated Torque (At 20% Load)   | 0.216 N-m (2.2 kgf-cm)                                       |               |          |
| Peak Torque                  | 1.08 N-m (11.0 kgf-cm)                                       |               |          |
| Idle Current (At Stopped)    | 35mA                                                         |               |          |
| Running Current (At No Load) | 200mA                                                        |               |          |
| Peak Current                 | 2,000mA                                                      |               |          |
| Operating Travel             | Servo Mode : ±60°(Default), ±150°(Programmable)              |               |          |
| Multi-Turn                   | Turn Mode : ±32760 turns (DroneCAN: n/a)                     |               |          |
| Servo Amplifier Type         | 32bit Programmable Digital                                   |               |          |
| Dimensions                   | 31.0 x 15.0 x 50.0mm (±0.2mm) / (1.220 x 0.590 x 1.969 inch) |               |          |
| Weight                       | 62.5g (±10%)                                                 |               |          |
| Housing                      | Rugged Aluminum Alloy With Hardcoat Anodizing                |               |          |
| Gear Reduction               | 5 Hardened Steel Gears                                       |               |          |
| Bearing                      | 8 Ball Bearing & 3 Needle Bearing & 1Thrust Bearing          |               |          |
| Horn Gear Spline             | Square 5.0 x 5.0                                             |               |          |
| Gear Train Backlash          | < 0.5°                                                       |               |          |
| Operation Temperature        | -30°C (-22°F) bis +70°C (+158°F)                             |               |          |
| MTTF                         | >1,000h                                                      |               |          |
| Radial Load On Output Shaft  | < 129.55N (13.21kgf)                                         |               |          |
| Push Load On Output Shaft    | < 1,025N (104.52kgf)                                         |               |          |
| Connector Type               | Circular                                                     |               |          |
| Connector                    | M5 4 Pins Female Panel Mount (M5*0.75 Front Fastened DIP)    |               |          |
| IP-Rating                    | IP68                                                         |               |          |



SG20BL-CAN-12V (M8 CIRCULAR)

#1-03169

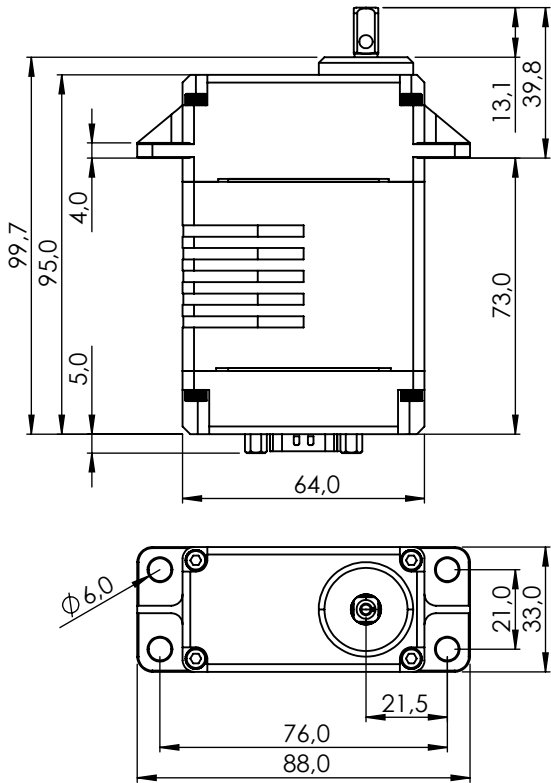


GENERAL SPECIFICATION

| SG20BL-CAN-12V (M8 Circular) |                                                                  |              |           |
|------------------------------|------------------------------------------------------------------|--------------|-----------|
| Control System               | CAN 2.0A,B / DroneCAN (UAVCAN v0)                                |              |           |
| Position Sensor Type         | Contactless Magnetic Encoder                                     |              |           |
| Motor Type                   | BLDC Motor                                                       |              |           |
| Operating Voltage Range      | 9.0V ~ 15.0V                                                     |              |           |
| Voltage                      | At 12.0V                                                         |              |           |
| No Load Speed                | 463.0 °/sec                                                      | 0.13 sec/60° | 77.17 RPM |
| Rated Torque (At 20% Load)   | 1.27 N·m (13.0 kgf·cm)                                           |              |           |
| Peak Torque                  | 6.37 N·m (65.0 kgf·cm)                                           |              |           |
| Idle Current (At Stopped)    | 30mA                                                             |              |           |
| Running Current (At No Load) | 500mA                                                            |              |           |
| Peak Current                 | 4,000mA                                                          |              |           |
| Operating Travel             | Servo Mode : ±60°(Default), ±150°(Programmable)                  |              |           |
| Multi-Turn                   | Turn Mode : ±32760 turns (DroneCAN: n/a)                         |              |           |
| Servo Amplifier Type         | 32bit Programmable Digital                                       |              |           |
| Dimensions                   | 45.0 x 20.0 x 75.0mm (±0.2mm) / (1.772 x 0.787 x 2.953 inch)     |              |           |
| Weight                       | Non-Clutch Type : 170g (±10%)                                    |              |           |
| Housing                      | Rugged Aluminum Alloy With Hardcoat Anodizing                    |              |           |
| Gear Reduction               | 5 Hardened Steel Gears                                           |              |           |
| Bearing                      | 3 Ball Bearing & 6 Needle Bearing & 1 Thrust Bearing             |              |           |
| Horn Gear Spline             | Square 6.5 x 6.5                                                 |              |           |
| Gear Train Backlash          | < 0.5°                                                           |              |           |
| Operation Temperature        | -30°C (-22°F) bis +70°C (+158°F)                                 |              |           |
| MTTF                         | >1,000h                                                          |              |           |
| Radial Load On Output Shaft  | <764.92N (78.0kgf)                                               |              |           |
| Push Load On Output Shaft    | <1,570N (160kgf)                                                 |              |           |
| Connector Type               | Circular                                                         |              |           |
| Connector                    | M8 B-coding 5 Pins Female Panel Mount With Wires(Front fastened) |              |           |
| IP-Rating                    | IP68                                                             |              |           |

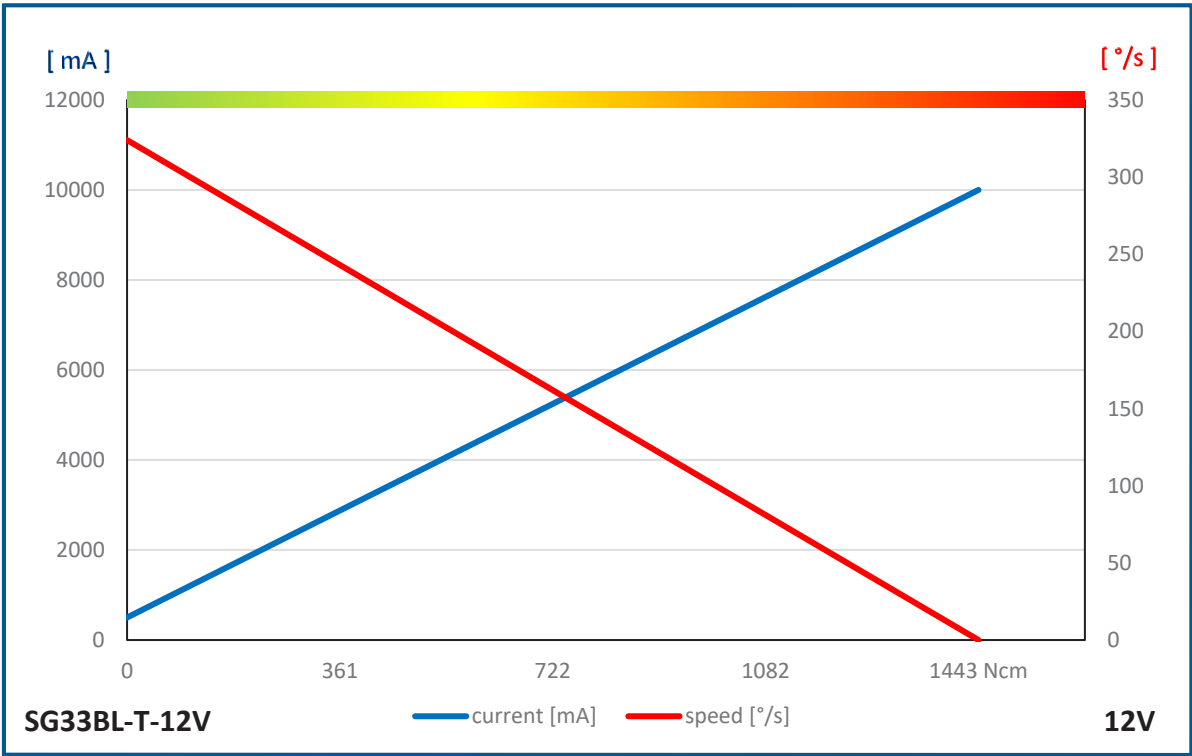
SG33BL-T-12V (DSUB)

#1-00932



1:2

PERFORMANCE CHART

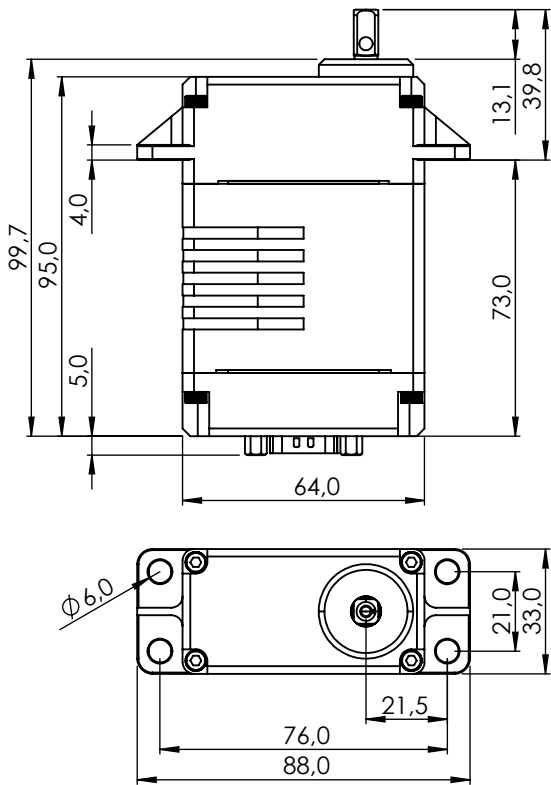


GENERAL SPECIFICATION

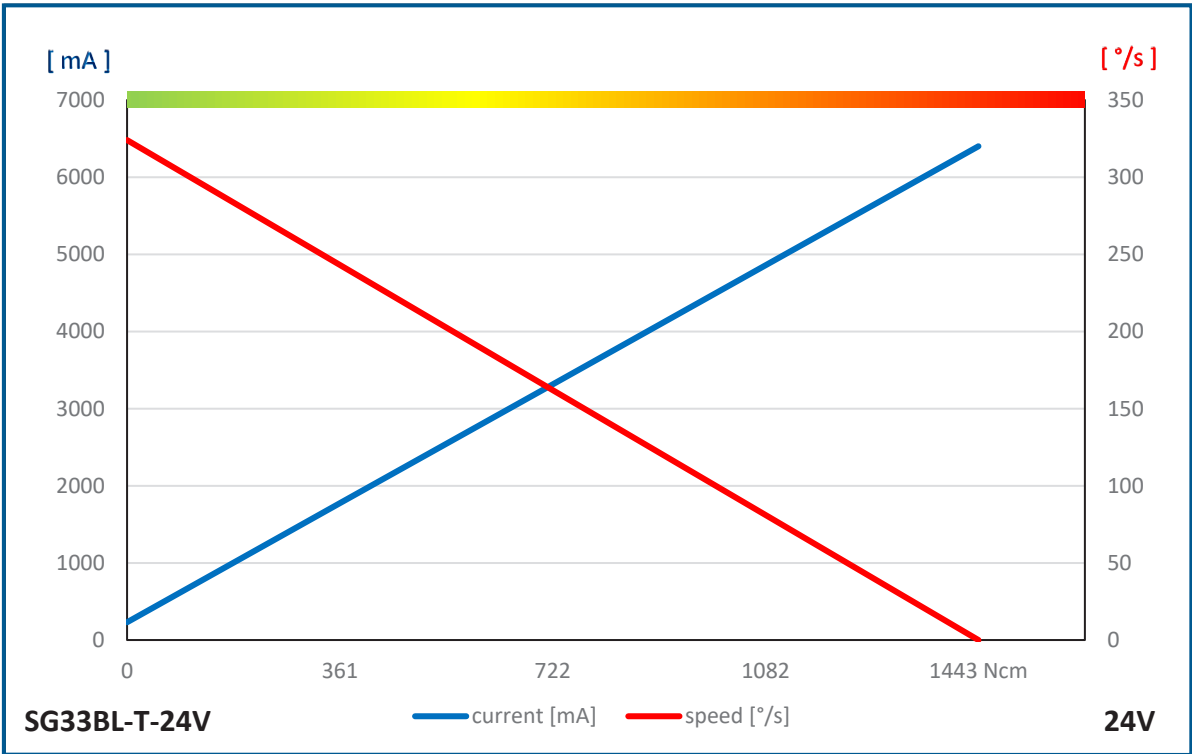
| SG33BL-T-12V (DSUB)                          |                                               |                       |
|----------------------------------------------|-----------------------------------------------|-----------------------|
| Control System                               | PWM / RS485 / TTL (Half Duplex)               |                       |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs      |                       |
| Connector Type                               | D-Sub 9                                       |                       |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                       |
| Motor Type                                   | BLDC                                          |                       |
| Amplifier / MCU                              | 32bit programmable Digital                    |                       |
| Operating Voltage Range                      | 9.0V ~ 15.0V                                  |                       |
| Operating Voltage                            | At 12.0V                                      |                       |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                       |
| Stall Torque                                 | 147.0kgcm (1442.1Ncm)                         |                       |
| Rest Current                                 | 30mA                                          |                       |
| Running Current at no Load                   | 500mA                                         |                       |
| Stall Current                                | 10000mA                                       |                       |
| Deadband Width                               | 2µs                                           |                       |
| Operating Travel                             | Default                                       | ±60°                  |
|                                              | Programmable                                  | ±160°                 |
|                                              | Multi Turn                                    | ±2880° (Max ±8 Turns) |
|                                              | Continuous Rotation                           | n/a                   |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                       |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                       |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN60068-2-6         |                       |
| Connector Wire Length                        | -                                             |                       |
| Connector Wire Gauge                         | -                                             |                       |
| Connector Wire Strand Count                  | -                                             |                       |
| External Dimensions                          | 64.0 x 33.0 x 95.0mm                          |                       |
| Weight*                                      | 480.0g                                        |                       |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                       |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                       |
| Gear Material                                | 4 Hardened Steel Gears                        |                       |
| Gear Train Backlash                          | Max. 0.5°                                     |                       |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                       |
| Accessories                                  | Mounting Harware, Servo Horn (I-MOS)          |                       |
| IP-Rating                                    | IP68                                          |                       |
| MTTF                                         | >1000h                                        |                       |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                       |
| Changelog                                    | -                                             |                       |
|                                              |                                               |                       |
| *of the servo only w/o horns and accessories |                                               |                       |

SG33BL-T-24V (DSUB)

#1-02462



PERFORMANCE CHART

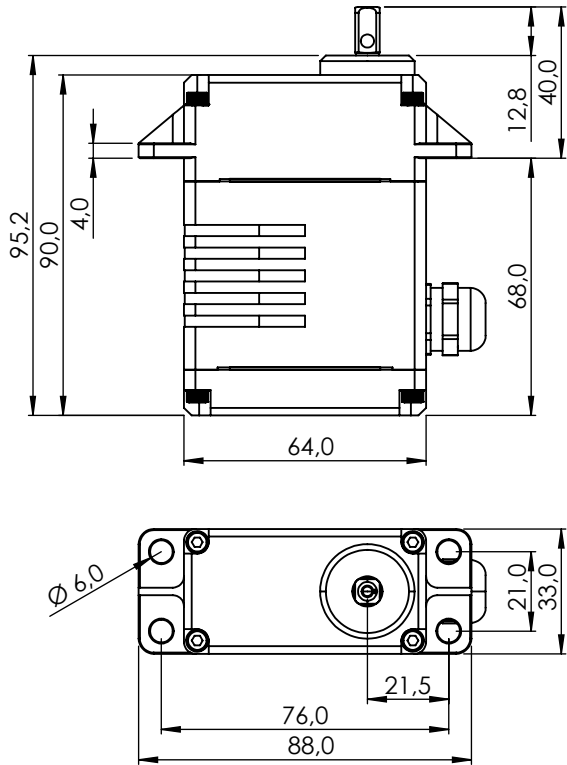


GENERAL SPECIFICATION

| SG33BL-T-24V (DSUB)                          |                                               |                       |
|----------------------------------------------|-----------------------------------------------|-----------------------|
| Control System                               | PWM / RS485 / TTL (Half Duplex)               |                       |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs      |                       |
| Connector Type                               | D-Sub 9                                       |                       |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                       |
| Motor Type                                   | BLDC                                          |                       |
| Amplifier / MCU                              | 32bit programmable Digital                    |                       |
| Operating Voltage Range                      | 22.0V ~ 26.0V                                 |                       |
| Operating Voltage                            | At 24.0V                                      |                       |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                       |
| Stall Torque                                 | 147.00kgcm (1442.1Ncm)                        |                       |
| Idle Current                                 | 20mA                                          |                       |
| No Load Running Current                      | 230mA                                         |                       |
| Stall Current                                | 6400mA                                        |                       |
| Deadband Width                               | 2µs                                           |                       |
| Operating Travel                             | Default                                       | ±60°                  |
|                                              | Programmable                                  | ±160°                 |
|                                              | Multi Turn                                    | ±2880° (Max ±8 Turns) |
|                                              | Continuous Rotation                           | n/a                   |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                       |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                       |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN60068-2-6         |                       |
| Connector Wire Length                        | -                                             |                       |
| Connector Wire Gauge                         | -                                             |                       |
| Connector Wire Strand Count                  | -                                             |                       |
| External Dimensions                          | 64.0 x 33.0 x 95.0mm                          |                       |
| Weight*                                      | 480.0g                                        |                       |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                       |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                       |
| Gear Material                                | 4 Hardened Steel Gears                        |                       |
| Gear Train Backlash                          | Max. 0.5°                                     |                       |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                       |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS)         |                       |
| IP-Rating                                    | IP68                                          |                       |
| MTTF                                         | >1000h                                        |                       |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                       |
| Changelog                                    | -                                             |                       |
|                                              |                                               |                       |
| *of the servo only w/o horns and accessories |                                               |                       |

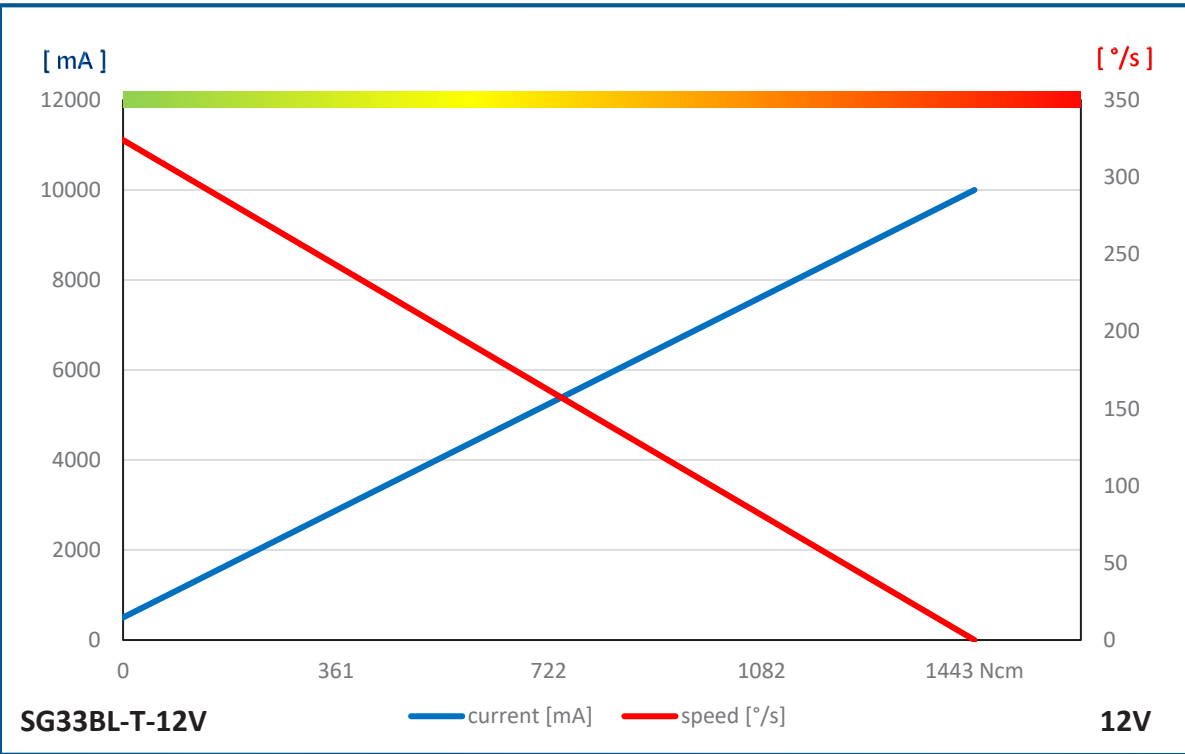
SG33BL-T-CAN-12V(GLANDCABLE)

#1-02345



1:2

PERFORMANCE CHART



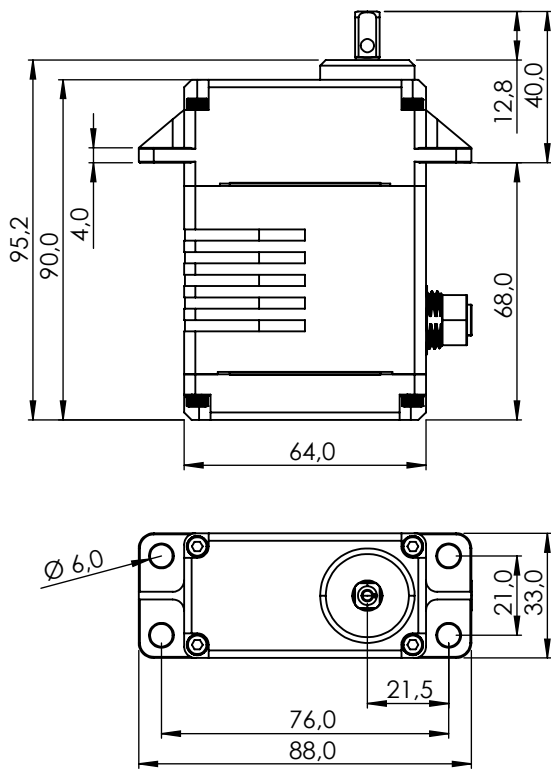
GENERAL SPECIFICATION

| SG33BL-T-CAN-12V (Gland Cable)               |                                               |                |               |               |          |
|----------------------------------------------|-----------------------------------------------|----------------|---------------|---------------|----------|
| Control System                               | CAN 2.0A,B / DroneCAN (UAVCAN v0)             |                |               |               |          |
|                                              | Protocol (Mode)                               | Standard 2.0A  |               | Extended 2.0B | DroneCAN |
|                                              | Baud-Rate                                     | 10kbps ~ 1Mbps |               |               |          |
|                                              | Sample-Point                                  | 50% or 87.5%   |               |               |          |
|                                              | Available SERVO ID                            | 1 ~ 254        |               |               | 1 ~ 127  |
|                                              | Available Node ID                             | 1 ~ 2047       | 1 ~ 536870911 |               | 1 ~ 127  |
|                                              | Input Signal Range                            | 0 ~ 5V         |               |               |          |
| Connector Type                               | -                                             |                |               |               |          |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                |               |               |          |
| Motor Type                                   | BLDC                                          |                |               |               |          |
| Amplifier / MCU                              | 32bit programmable Digital                    |                |               |               |          |
| Operating Voltage Range                      | 9.0 ~ 15.0V                                   |                |               |               |          |
| Operating Voltage                            | At 12.0V                                      |                |               |               |          |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                |               |               |          |
| Stall Torque                                 | 147.0kgcm (1442.1Ncm)                         |                |               |               |          |
| Rest Current                                 | 30mA                                          |                |               |               |          |
| Running Current at no Load                   | 500mA                                         |                |               |               |          |
| Stall Current                                | 10000mA                                       |                |               |               |          |
| Deadband Width                               | -                                             |                |               |               |          |
| Travel                                       | Travel / Command                              | 90° / 4096     |               |               |          |
|                                              | Servo mode                                    | Left           | Center        | Right         |          |
|                                              | Pos Command                                   | +1366          | +8192         | +15018        |          |
|                                              | Pos [°]                                       | -150           | 0             | +150          |          |
|                                              | Turn Mode                                     | Left           | Power On      | Right         |          |
|                                              | Pos Command                                   | -16383         | 0             | +16383        |          |
|                                              | Pos [°]                                       | -359           | 0             | +359          |          |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                    |                |               |               |          |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                |               |               |          |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                |               |               |          |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN 60068-2-6        |                |               |               |          |
| Connector Wire Length                        | 400mm                                         |                |               |               |          |
| Connector Wire Gauge                         | 20AWG                                         |                |               |               |          |
| Connector Wire Strand Count                  | 80/0.08                                       |                |               |               |          |
| External Dimensions                          | 64.0 x 33.0 x 90.0mm                          |                |               |               |          |
| Weight*                                      | 500.0g                                        |                |               |               |          |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                |               |               |          |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                |               |               |          |
| Gear Material                                | 4 Hardened Steel Gears                        |                |               |               |          |
| Gear Train Backlash                          | Max. 0.5°                                     |                |               |               |          |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                |               |               |          |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS)         |                |               |               |          |
| IP-Rating                                    | IP68                                          |                |               |               |          |
| MTTF                                         | >1000h                                        |                |               |               |          |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                |               |               |          |
| Changelog                                    | -                                             |                |               |               |          |
|                                              |                                               |                |               |               |          |
| *of the servo only w/o horns and accessories |                                               |                |               |               |          |



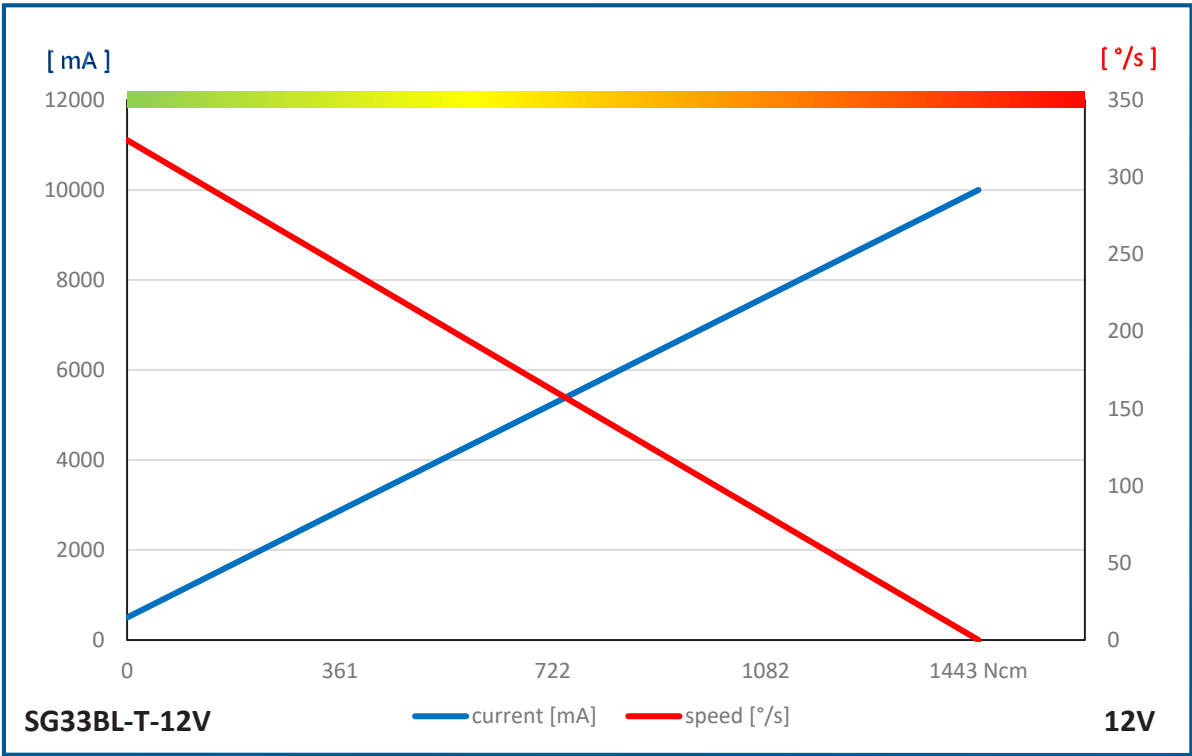
SG33BL-T-CAN-12V (CIRCULAR)

#1-02346



1:2

PERFORMANCE CHART

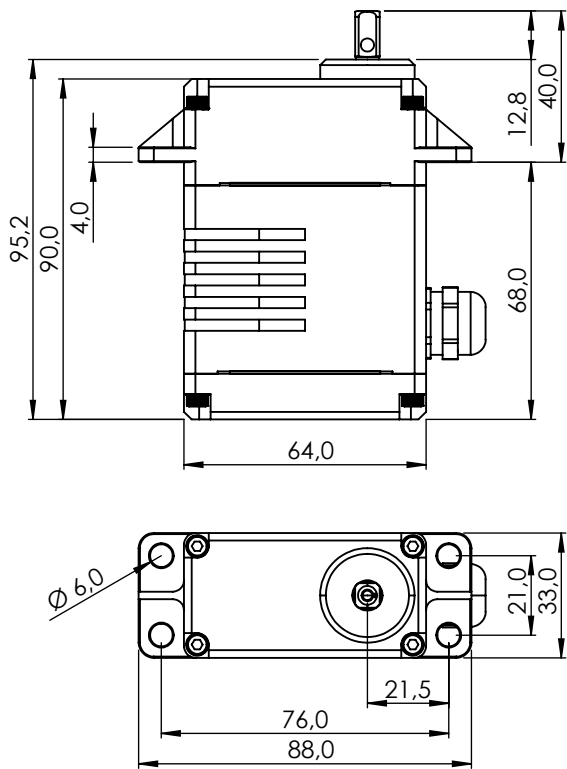


GENERAL SPECIFICATION

| SG33BL-T-CAN-12V (Circular)                  |                                               |                |               |               |
|----------------------------------------------|-----------------------------------------------|----------------|---------------|---------------|
| Control System                               | CAN 2.0A,B / DroneCAN (UAVCAN v0)             |                |               |               |
|                                              | Protocol (Mode)                               | Standard 2.0A  |               | Extended 2.0B |
|                                              | Baud-Rate                                     | 10kbps ~ 1Mbps |               |               |
|                                              | Sample-Point                                  | 50% or 87.5%   |               |               |
|                                              | Available SERVO ID                            | 1 ~ 254        |               | 1 ~ 127       |
|                                              | Available Node ID                             | 1 ~ 2047       | 1 ~ 536870911 | 1 ~ 127       |
|                                              | Input Signal Range                            | 0 ~ 5V         |               |               |
| Connector Type                               | Circular                                      |                |               |               |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                |               |               |
| Motor Type                                   | BLDC                                          |                |               |               |
| Amplifier / MCU                              | 32bit programmable Digital                    |                |               |               |
| Operating Voltage Range                      | 9.0 ~ 15.0V                                   |                |               |               |
| Operating Voltage                            | At 12.0V                                      |                |               |               |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                |               |               |
| Stall Torque                                 | 147.0kgcm (1442.1Ncm)                         |                |               |               |
| Rest Current                                 | 30mA                                          |                |               |               |
| Running Current at no Load                   | 500mA                                         |                |               |               |
| Stall Current                                | 10000mA                                       |                |               |               |
| Deadband Width                               | -                                             |                |               |               |
| Travel                                       | Travel / Command                              | 90° / 4096     |               |               |
|                                              | Servo mode                                    | Left           | Center        | Right         |
|                                              | Pos Command                                   | +1366          | +8192         | +15018        |
|                                              | Pos [°]                                       | -150           | 0             | +150          |
|                                              | Turn Mode                                     | Left           | Power On      | Right         |
|                                              | Pos Command                                   | -16383         | 0             | +16383        |
|                                              | Pos [°]                                       | -359           | 0             | +359          |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                    |                |               |               |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                |               |               |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                |               |               |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN 60068-2-6        |                |               |               |
| Connector Wire Length                        | -                                             |                |               |               |
| Connector Wire Gauge                         | -                                             |                |               |               |
| Connector Wire Strand Count                  | -                                             |                |               |               |
| External Dimensions                          | 64.0 x 33.0 x 90.0mm                          |                |               |               |
| Weight*                                      | 480.0g                                        |                |               |               |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                |               |               |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                |               |               |
| Gear Material                                | 4 Hardened Steel Gears                        |                |               |               |
| Gear Train Backlash                          | Max. 0.5°                                     |                |               |               |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                |               |               |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS)         |                |               |               |
| IP-Rating                                    | IP68                                          |                |               |               |
| MTTF                                         | >1000h                                        |                |               |               |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                |               |               |
| Changelog                                    | -                                             |                |               |               |
|                                              |                                               |                |               |               |
| *of the servo only w/o horns and accessories |                                               |                |               |               |

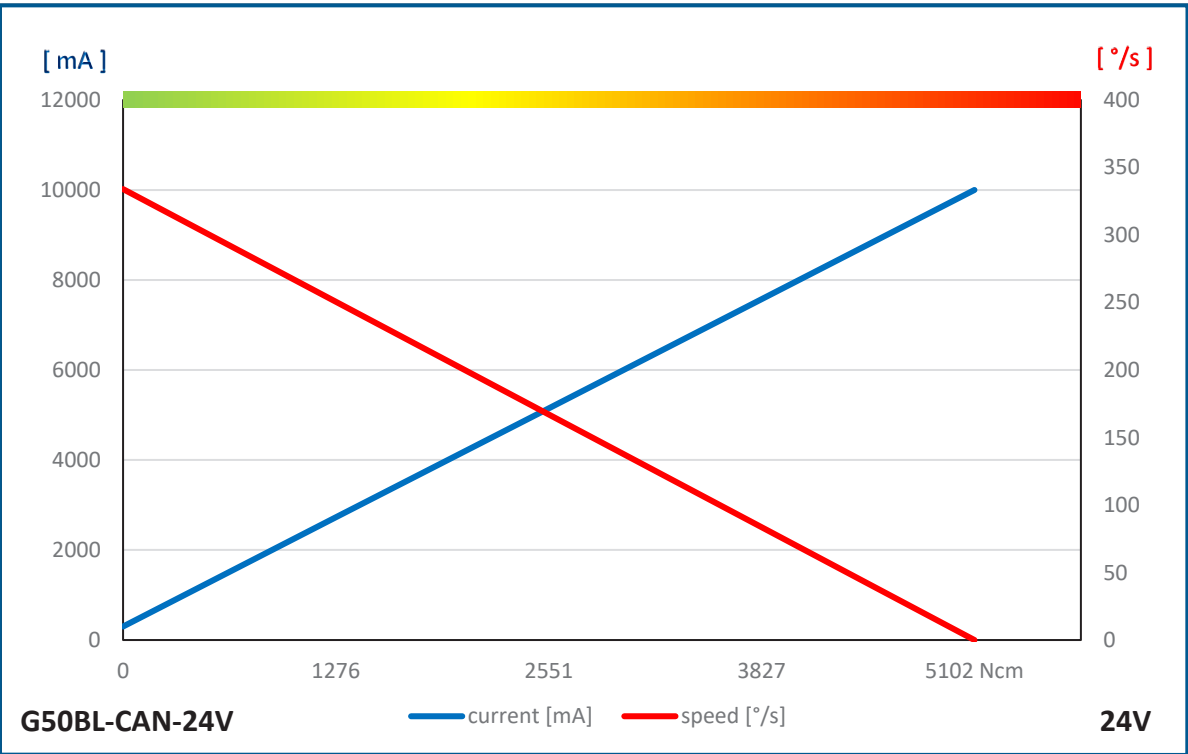
SG33BL-T-CAN-24V (GLAND CABLE)

#1-02464



1:2

PERFORMANCE CHART

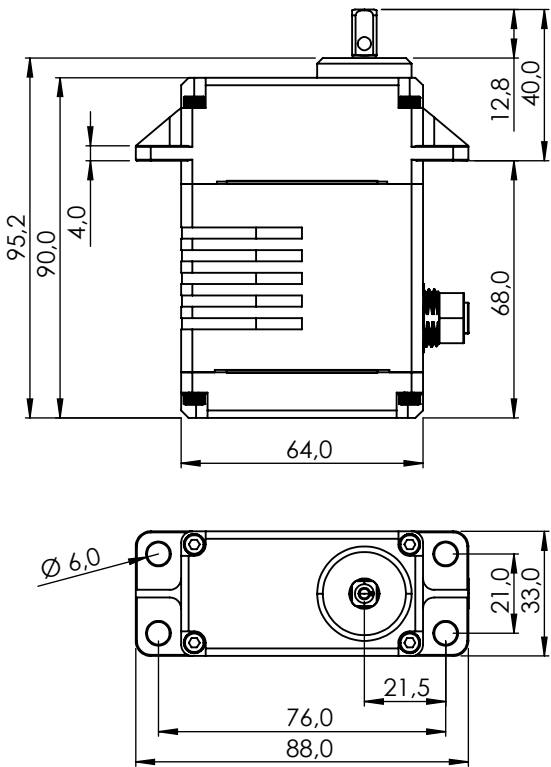


GENERAL SPECIFICATION

| SG33BL-T-CAN-24V (Gland Cable)               |                                               |                |               |               |
|----------------------------------------------|-----------------------------------------------|----------------|---------------|---------------|
| Control System                               | CAN2.0A,B / DroneCAN (UAVCAN v0)              |                |               |               |
|                                              | Protocol (Mode)                               | Standard 2.0A  |               | Extended 2.0B |
|                                              | Baud-Rate                                     | 10kbps ~ 1Mbps |               |               |
|                                              | Sample-Point                                  | 50% or 87.5%   |               |               |
|                                              | Available SERVO ID                            | 1 ~ 254        |               | 1 ~ 127       |
|                                              | Available Node ID                             | 1 ~ 2047       | 1 ~ 536870911 | 1 ~ 127       |
|                                              | Input Signal Range                            | 0 ~ 5V         |               |               |
| Connector Type                               | -                                             |                |               |               |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                |               |               |
| Motor Type                                   | BLDC                                          |                |               |               |
| Amplifier / MCU                              | 32Bit programmable Digital                    |                |               |               |
| Operating Voltage Range                      | 18.0 ~ 32.0V                                  |                |               |               |
| Operating Voltage                            | At 24.0V                                      |                |               |               |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                |               |               |
| Stall Torque                                 | 147.0kgcm (1442.1Ncm)                         |                |               |               |
| Rest Current                                 | 20mA                                          |                |               |               |
| Running Current at no Load                   | 230mA                                         |                |               |               |
| Stall Current                                | 6400mA                                        |                |               |               |
| Deadband Width                               | -                                             |                |               |               |
| Travel                                       | Travel / Command                              | 90° / 4096     |               |               |
|                                              | Servo mode                                    | Left           | Center        | Right         |
|                                              | Pos Command                                   | +1366          | +8192         | +15018        |
|                                              | Pos [°]                                       | -150           | 0             | +150          |
|                                              | Turn Mode                                     | Left           | Power On      | Right         |
|                                              | Pos Command                                   | -16383         | 0             | +16383        |
|                                              | Pos [°]                                       | -359           | 0             | +359          |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                    |                |               |               |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                |               |               |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                |               |               |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN 60068-2-6        |                |               |               |
| Connector Wire Length                        | 400mm                                         |                |               |               |
| Connector Wire Gauge                         | 20AWG                                         |                |               |               |
| Connector Wire Strand Count                  | 80/0.08                                       |                |               |               |
| External Dimensions                          | 64.0 x 33.0 x 90.0mm                          |                |               |               |
| Weight*                                      | 500.0g                                        |                |               |               |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                |               |               |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                |               |               |
| Gear Material                                | 4 Hardened Steel Gears                        |                |               |               |
| Gear Train Backlash                          | Max. 0.5°                                     |                |               |               |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                |               |               |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS)         |                |               |               |
| IP-Rating                                    | IP68                                          |                |               |               |
| MTTF                                         | >1000h                                        |                |               |               |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                |               |               |
| Changelog                                    | -                                             |                |               |               |
|                                              |                                               |                |               |               |
| *of the servo only w/o horns and accessories |                                               |                |               |               |

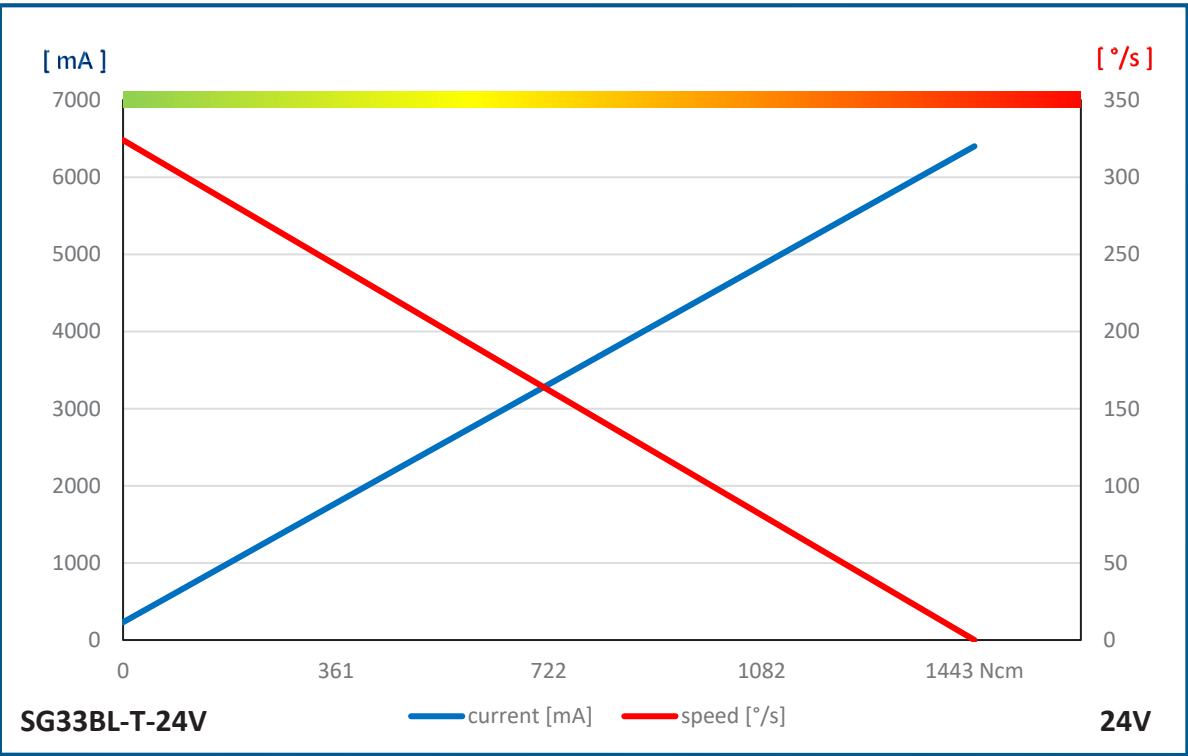
SG33BL-T-CAN-24V (CIRCULAR)

#1-02465



1:2

PERFORMANCE CHART

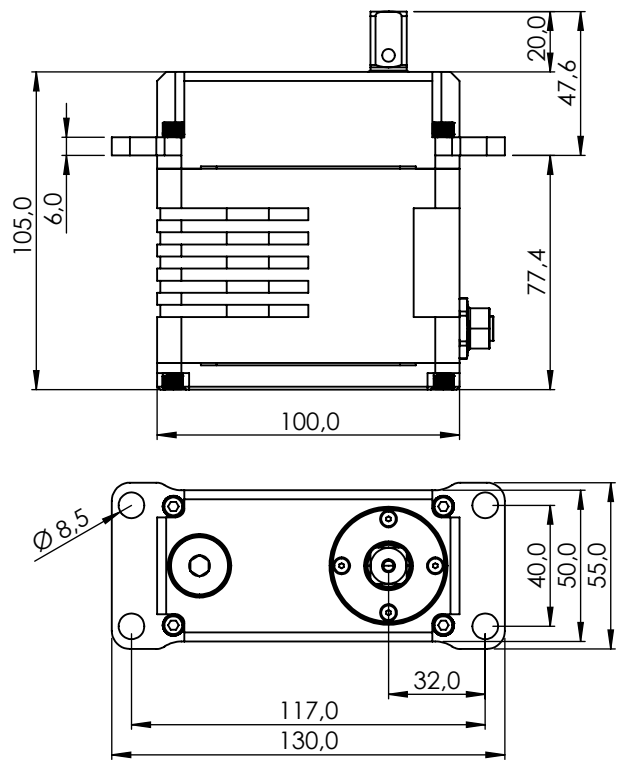


GENERAL SPECIFICATION

| SG33BL-T-CAN-24V (Circular)                  |                                               |                            |               |               |          |
|----------------------------------------------|-----------------------------------------------|----------------------------|---------------|---------------|----------|
| Control System                               | CAN 2.0A,B / DroneCAN (UAVCAN v0)             |                            |               |               |          |
|                                              | Protocol (Mode)                               | Standard 2.0A              |               | Extended 2.0B | DroneCAN |
|                                              | Baud-Rate                                     | 10kbps ~ 1Mbps             |               |               |          |
|                                              | Sample-Point                                  | 50% or 87.5%               |               |               |          |
|                                              | Available SERVO ID                            | 1 ~ 254                    |               |               | 1 ~ 127  |
|                                              | Available Node ID                             | 1 ~ 2047                   | 1 ~ 536870911 |               | 1 ~ 127  |
|                                              | Input Signal Range                            | 0 ~ 5V                     |               |               |          |
| Connector Type                               | Circular                                      |                            |               |               |          |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                            |               |               |          |
| Motor Type                                   | BLDC                                          |                            |               |               |          |
| Amplifier / MCU                              | 32bit programmable Digital                    |                            |               |               |          |
| Operating Voltage Range                      | 18.0 ~ 32.0V                                  |                            |               |               |          |
| Operating Voltage                            | At 24.0V                                      |                            |               |               |          |
| Operating Speed at no Load                   | 324°/s (54RPM)                                |                            |               |               |          |
| Stall Torque                                 | 147.0kgcm (1442.1Ncm)                         |                            |               |               |          |
| Rest Current                                 | 20mA                                          |                            |               |               |          |
| Running Current at no Load                   | 230mA                                         |                            |               |               |          |
| Stall Current                                | 6400mA                                        |                            |               |               |          |
| Deadband Width                               | -                                             |                            |               |               |          |
| Travel                                       | Travel / Command                              | 90° / 4096                 |               |               |          |
|                                              | Servo mode                                    | Left                       | Center        | Right         |          |
|                                              | Pos Command                                   | +1366                      | +8192         | +15018        |          |
|                                              | Pos [°]                                       | -150                       | 0             | +150          |          |
|                                              | Turn Mode                                     | Left                       | Power On      | Right         |          |
|                                              | Pos Command                                   | -16383                     | 0             | +16383        |          |
|                                              | Pos [°]                                       | -359                       | 0             | +359          |          |
|                                              | Turn Range                                    | -32760 ~ +32760 (CAN only) |               |               |          |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                            |               |               |          |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                            |               |               |          |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII / EN 60068-2-6        |                            |               |               |          |
| Connector Wire Length                        | -                                             |                            |               |               |          |
| Connector Wire Gauge                         | -                                             |                            |               |               |          |
| Connector Wire Strand Count                  | -                                             |                            |               |               |          |
| External Dimensions                          | 64.0 x 33.0 x 90.0mm                          |                            |               |               |          |
| Weight*                                      | 480.0g                                        |                            |               |               |          |
| Ball Bearing                                 | 6 Ball Bearings & 2 Needle Bearings           |                            |               |               |          |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                            |               |               |          |
| Gear Material                                | 4 Hardened Steel Gears                        |                            |               |               |          |
| Gear Train Backlash                          | Max. 0.5°                                     |                            |               |               |          |
| Horn Gear Spline                             | Square 6.5 x 6.5                              |                            |               |               |          |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS)         |                            |               |               |          |
| IP-Rating                                    | IP68                                          |                            |               |               |          |
| MTTF                                         | >1000h                                        |                            |               |               |          |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                            |               |               |          |
| Changelog                                    | -                                             |                            |               |               |          |
|                                              |                                               |                            |               |               |          |
| *of the servo only w/o horns and accessories |                                               |                            |               |               |          |

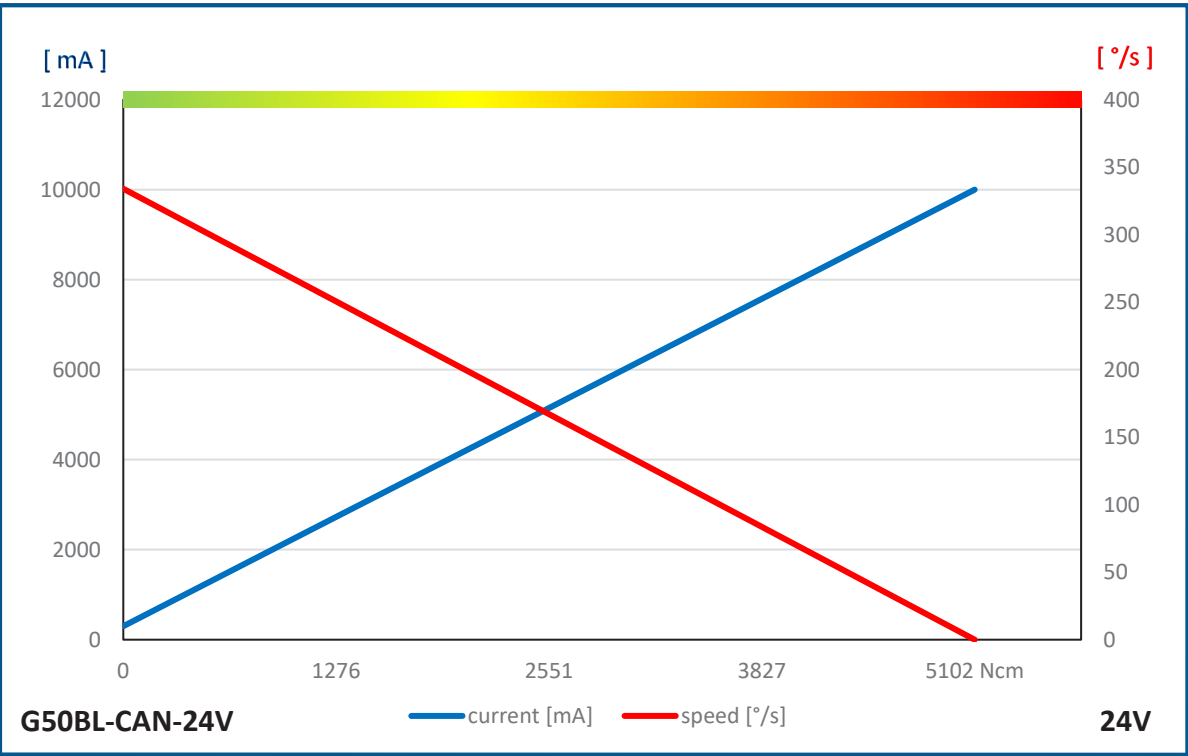
SG50BL-CAN-24V(CIRCULAR)

#1-02412



1:2,5

PERFORMANCE CHART



GENERAL SPECIFICATION

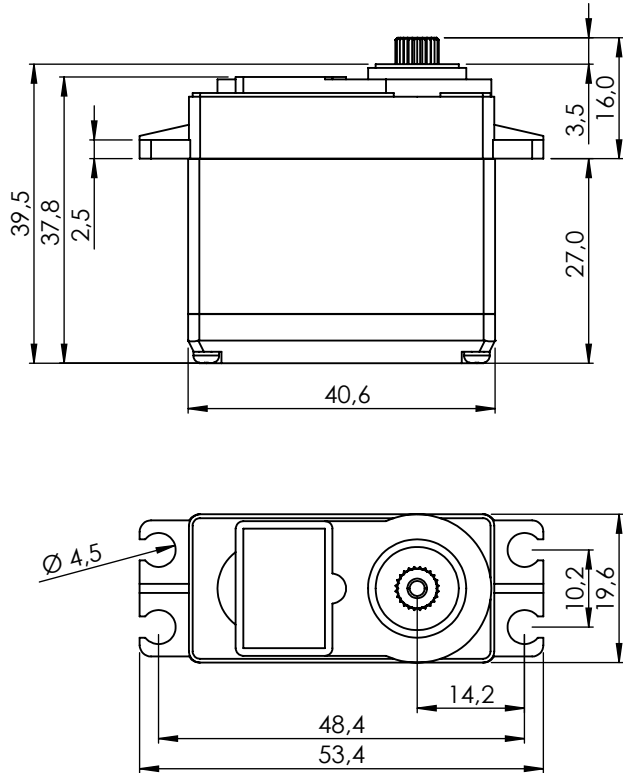
| SG50BL-CAN-24V (Circular)                    |                                               |                            |               |               |          |
|----------------------------------------------|-----------------------------------------------|----------------------------|---------------|---------------|----------|
| Control System                               | CAN 2.0A,B / DroneCAN (UAVCAN v0)             |                            |               |               |          |
|                                              | Protocol (Mode)                               | Standard 2.0A              |               | Extended 2.0B | DroneCAN |
|                                              | Baud-Rate                                     | 10kbps ~ 1Mbps             |               |               |          |
|                                              | Sample-Point                                  | 50% or 87.5%               |               |               |          |
|                                              | Available SERVO ID                            | 1 ~ 254                    |               |               | 1 ~ 127  |
|                                              | Available Node ID                             | 1 ~ 2047                   | 1 ~ 536870911 |               | 1 ~ 127  |
|                                              | Input Signal Range                            | 0 ~ 5V                     |               |               |          |
| Connector Type                               | Circular                                      |                            |               |               |          |
| Position Sensor Type                         | Contactless Magnetic Encoder                  |                            |               |               |          |
| Motor Type                                   | BLDC                                          |                            |               |               |          |
| Amplifier / MCU                              | 32bit programmable Digital                    |                            |               |               |          |
| Operating Voltage Range                      | 18.0 ~ 32.0V                                  |                            |               |               |          |
| Operating Voltage                            | At 24.0V                                      |                            |               |               |          |
| Operating Speed at no Load                   | 120°/s (20RPM)                                |                            |               |               |          |
| Stall Torque                                 | 520.0kgcm (5101.2Ncm)                         |                            |               |               |          |
| Rest Current                                 | 45mA                                          |                            |               |               |          |
| Running Current at no Load                   | 300mA                                         |                            |               |               |          |
| Stall Current                                | 10000mA                                       |                            |               |               |          |
| Deadband Width                               | -                                             |                            |               |               |          |
| Travel                                       | Travel / Command                              | 90° / 4096                 |               |               |          |
|                                              | Servo mode                                    | Left                       | Center        | Right         |          |
|                                              | Pos Command                                   | +1366                      | +8192         | +15018        |          |
|                                              | Pos [°]                                       | -150                       | 0             | +150          |          |
|                                              | Turn Mode                                     | Left                       | Power On      | Right         |          |
|                                              | Pos Command                                   | -16383                     | 0             | +16383        |          |
|                                              | Pos [°]                                       | -359                       | 0             | +359          |          |
|                                              | Turn Range                                    | -32760 ~ +32760 (CAN only) |               |               |          |
| Operating Temperature Range                  | -30°C ~ +70°C (-22°F ~ +158°F)                |                            |               |               |          |
| Storage Temperature Range                    | -40°C ~ +80°C (-40°F ~ +176°F)                |                            |               |               |          |
| Vibrations at no Load                        | MIL-STD 810G 514.6C VII / EN 60068-2-6        |                            |               |               |          |
| Connector Wire Length                        | -                                             |                            |               |               |          |
| Connector Wire Gauge                         | -                                             |                            |               |               |          |
| Connector Wire Strand Count                  | -                                             |                            |               |               |          |
| External Dimensions                          | 100.0 x 50.0 x 105.0mm                        |                            |               |               |          |
| Weight*                                      | 1450g                                         |                            |               |               |          |
| Ball Bearing                                 | 4 Angular Ball Bearings & 9 Needle Bearings   |                            |               |               |          |
| Case Material                                | Rugged Aluminum Alloy With Hardcoat Anodizing |                            |               |               |          |
| Gear Material                                | 5 Hardened Steel Gears                        |                            |               |               |          |
| Gear Train Backlash                          | Max. 0.5°                                     |                            |               |               |          |
| Horn Gear Spline                             | Square 12.0 x 12.0                            |                            |               |               |          |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MOS12)       |                            |               |               |          |
| IP-Rating                                    | IP68                                          |                            |               |               |          |
| MTTF                                         | >1000h                                        |                            |               |               |          |
| Revision & Stand                             | Rev. 1.2 / 01.02.2024                         |                            |               |               |          |
| Changelog                                    | -                                             |                            |               |               |          |
|                                              |                                               |                            |               |               |          |
| *of the servo only w/o horns and accessories |                                               |                            |               |               |          |

\*of the servo only w/o horns and accessories



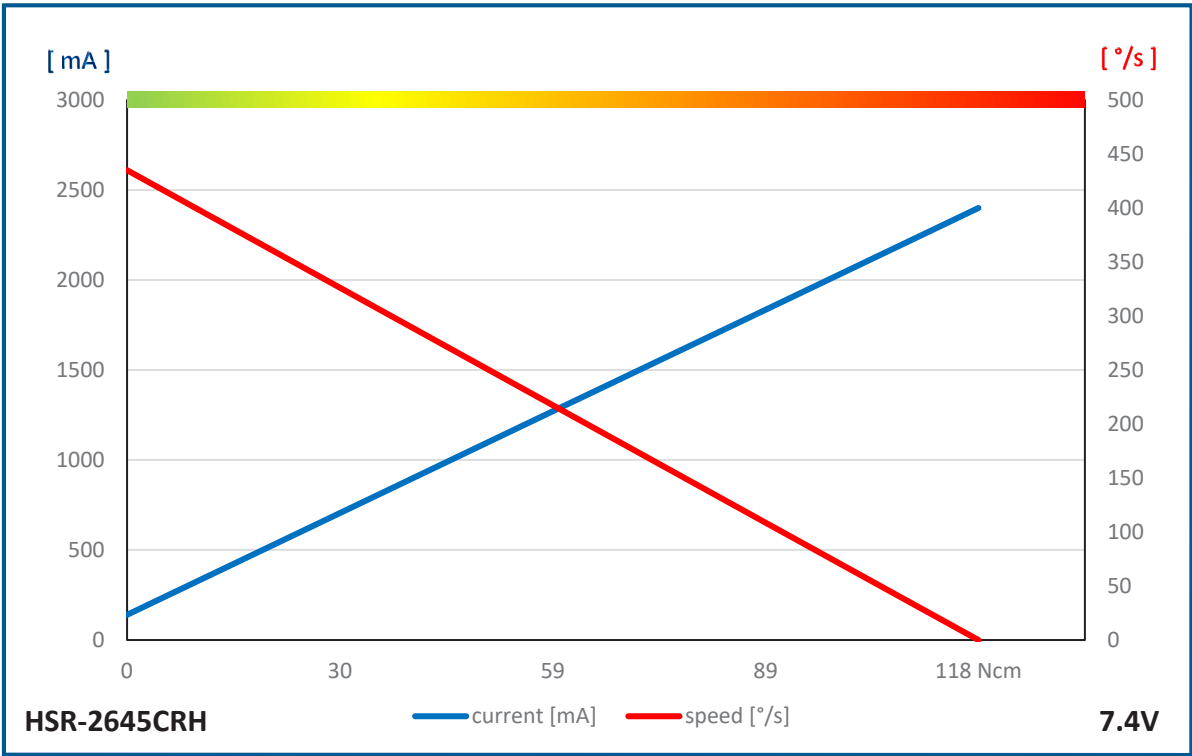
# HSR-2645CRH

#138645  
#1-02360 GP 24 Stück



1:1

## PERFORMANCE CHART



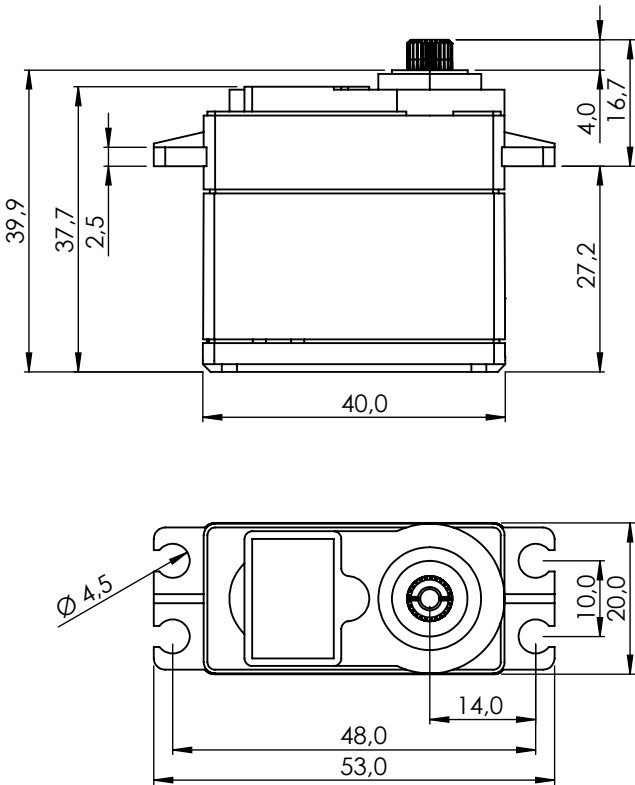
## GENERAL SPECIFICATION

| HSR-2645CRH                                   |                                                       |                     |
|-----------------------------------------------|-------------------------------------------------------|---------------------|
| Control System                                | PWM                                                   |                     |
|                                               | Pulse Width 900µs 1500µs (Center) 2100µs              |                     |
| Connector Type                                | Hitec 3P (JR 3P compatible)                           |                     |
| Position Sensor Type                          | -                                                     |                     |
| Motor Type                                    | Cored Carbon Brush                                    |                     |
| Amplifier / MCU                               | 8bit programmable Digital Amplifier with Mosfet Drive |                     |
| Operating Voltage Range                       | 3.5V ~ 8.4V                                           |                     |
| Operating Voltage                             | At 6.0V                                               | At 7.4V             |
| Operating Speed at no Load                    | 347°/s (58RPM)                                        | 435°/s (72RPM)      |
| Stall Torque                                  | 10.0kgcm (98.1Ncm)                                    | 12.0kgcm (117.7Ncm) |
| Peak Efficiency Torque                        | 2.0kgcm (19.6Ncm)                                     | 2.4kgcm (23.5Ncm)   |
| Rest Current                                  | 3mA                                                   | 3mA                 |
| Running Current at no Load                    | 120mA                                                 | 140mA               |
| Stall Current                                 | 2000mA                                                | 2400mA              |
| Deadband Width                                | -                                                     | -                   |
| Operating Travel                              | Default                                               | Continuous Rotation |
|                                               | Programmable                                          | Yes                 |
|                                               | Multi Turn/Continuous Rotation                        | Yes / Yes           |
| Operating Temperature Range                   | -20°C ~ +60°C (-4°F ~ +140°F)                         |                     |
| Storage Temperature Range                     | -30°C ~ +80°C (-22°F ~+176°F)                         |                     |
| Connector Wire Length                         | 300mm                                                 |                     |
| Connector Wire Gauge                          | 22AWG                                                 |                     |
| Connector Wire Strand Count                   | 60/0.08                                               |                     |
| External Dimensions                           | 40.6 x 19.6 x 37.8mm                                  |                     |
| Weight*                                       | 53.0g                                                 |                     |
| Ball Bearing                                  | Dual Ball Bearing                                     |                     |
| Case Material                                 | Engineering Plastic                                   |                     |
| Gear Material                                 | 1 Metal-Plastic & 3 Metal Gears                       |                     |
| Gear Train Backlash                           | Max 0.5°                                              |                     |
| Horn Gear Spline                              | H24T Ø6.0                                             |                     |
| Accessories                                   | Mounting Hardware, Servo Horn (R-O)                   |                     |
| IP-Rating                                     | IP4X                                                  |                     |
| Revision                                      | Rev. 1.0 / 02.01.2024                                 |                     |
| Changelog                                     | -                                                     |                     |
|                                               |                                                       |                     |
| * of the servo only w/o horns and accessories |                                                       |                     |
|                                               |                                                       |                     |



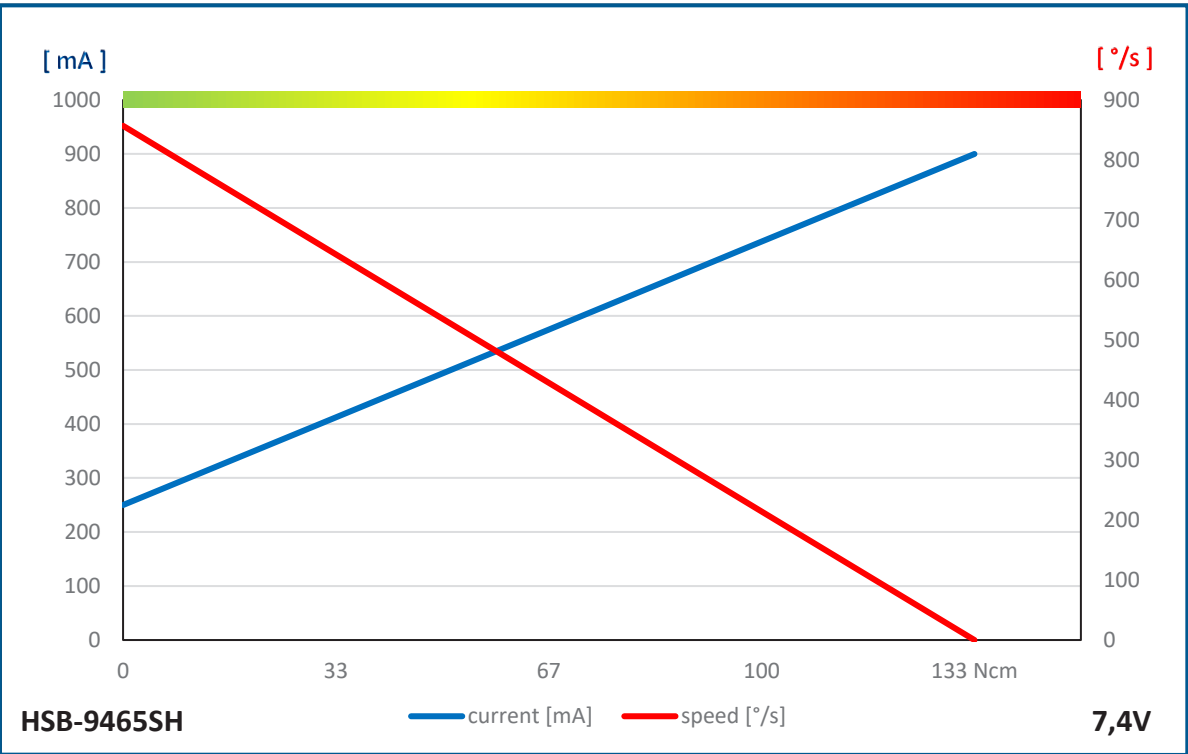
HSB-9465SH

#116465  
#1-02355 GP 24 STÜCK



1:1

PERFORMANCE CHART

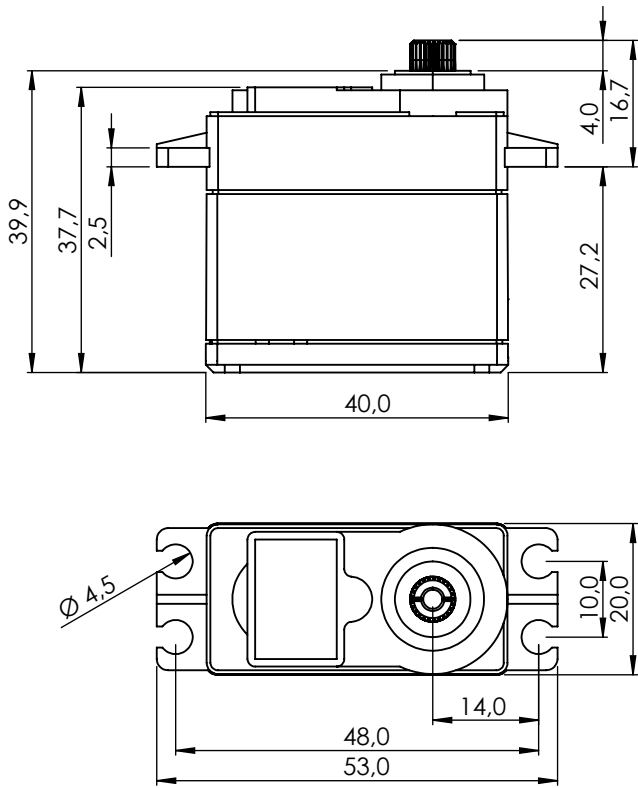


GENERAL SPECIFICATION

| HSB-9465SH                              |                                                                        |                     |
|-----------------------------------------|------------------------------------------------------------------------|---------------------|
| Control System                          | PWM                                                                    |                     |
|                                         | Pulse Width 900µs 1500µs (Center) 2100µs                               |                     |
| Connector Type                          | Hitec 3P (JR 3P compatible)                                            |                     |
| Position Sensor Type                    | Indirect Drive / 4 Slider / 1M Cylce Long Life                         |                     |
| Motor Type                              | BLDC                                                                   |                     |
| Ampflifier / MCU                        | 16bit programmable Digital Amplifier with Mosfet Drive                 |                     |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                                            |                     |
| Operating Voltage                       | At 6.0V                                                                | At 7.4V             |
| Operating Speed at no Load              | 667°/s (111RPM)                                                        | 857°/s (143RPM)     |
| Stall Torque                            | 13.5kgcm (132.4Ncm)                                                    | 13.5kgcm (132.4Ncm) |
| Peak Efficiency Torque                  | 2.7kgcm (26.5Ncm)                                                      | 2.7kgcm (26.5Ncm)   |
| Rest Current                            | 30mA                                                                   | 30mA                |
| Running Current at no Load              | 250mA                                                                  | 250mA               |
| Stall Current                           | 1100mA                                                                 | 900mA               |
| Deadband Width                          | 1µs                                                                    | 1µs                 |
| Operating Travel                        | Default                                                                | ±60°                |
|                                         | Programmable                                                           | Max. 160°           |
|                                         | Multi Turn/Continuous Rotation                                         | n/a / n/a           |
| Operating Temperature Range             | -20°C ~ +60°C (-4°F ~ +140°F)                                          |                     |
| Storage Temperature Range               | -30°C ~ +80°C (-22°F ~+176°F)                                          |                     |
| Connector Wire Length                   | 300mm                                                                  |                     |
| Connector Wire Gauge                    | 20AWG                                                                  |                     |
| Connector Wire Strand Count             | 80/0.08                                                                |                     |
| External Dimensions                     | 40.0 x 20.0 x 37.7mm                                                   |                     |
| Weight*                                 | 62.0g                                                                  |                     |
| Ball Bearing                            | Dual Ball Bearing                                                      |                     |
| Case Material                           | Engineering Plastic                                                    |                     |
| Gear Material                           | 1 Metal-Plastic & 3 Steel Gears                                        |                     |
| Gear Train Backlash                     | Max. 0.5°                                                              |                     |
| Horn Gear Spline                        | H25T Ø6.0                                                              |                     |
| Accessories                             | Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25 |                     |
| IP-Rating                               | IP54                                                                   |                     |
| Revision                                | Rev. 1.1 / 03.01.2024                                                  |                     |
| Changelog                               | -                                                                      |                     |
|                                         |                                                                        |                     |
| *of the servo w/o horns and accessories |                                                                        |                     |

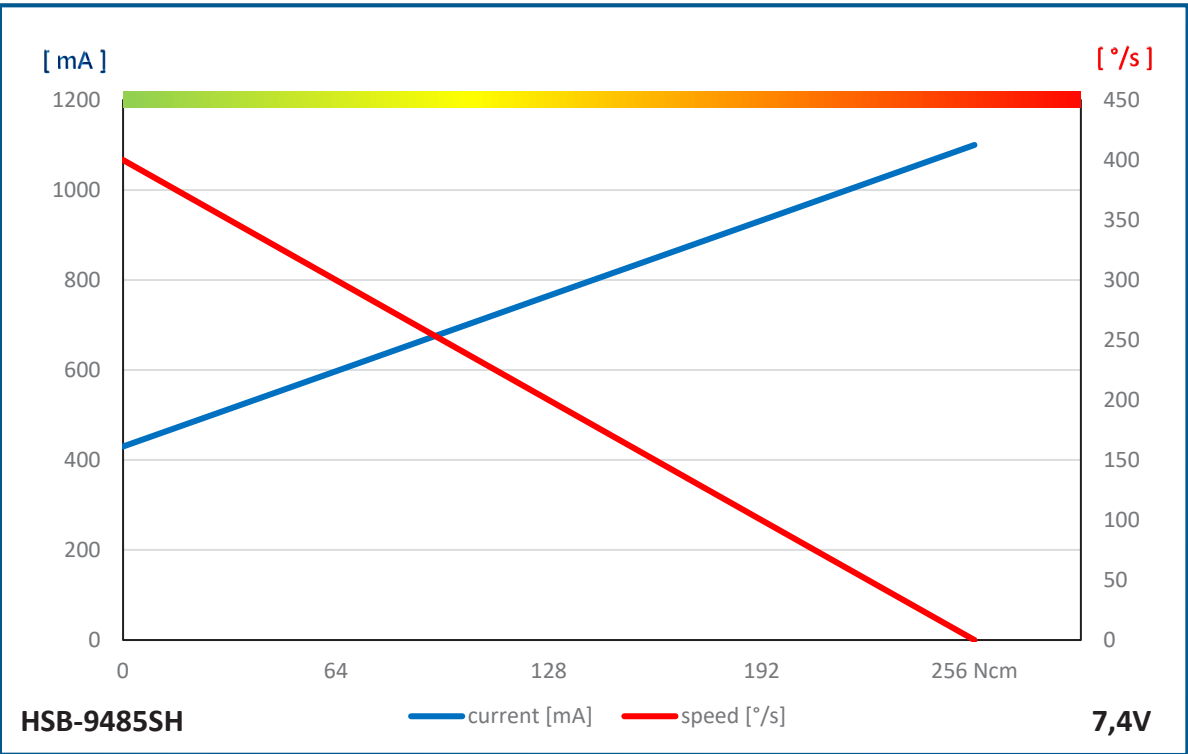
HSB-9485SH

#116485  
#1-02356 GP 24 STÜCK



1:1

PERFORMANCE CHART

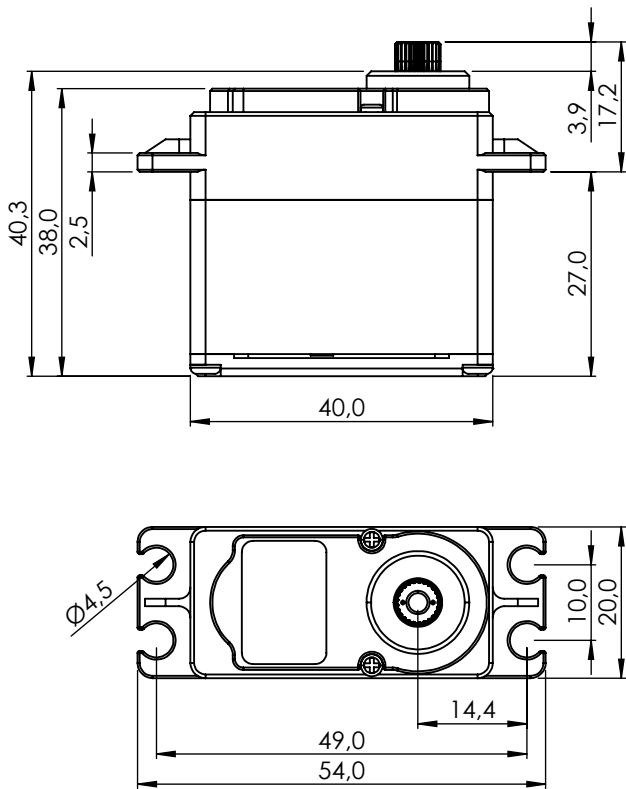


GENERAL SPECIFICATION

| HSB-9485SH                              |                                                                                      |                     |
|-----------------------------------------|--------------------------------------------------------------------------------------|---------------------|
| Control System                          | PWM                                                                                  |                     |
|                                         | Pulse Width 900µs 1500µs (Center) 2100µs                                             |                     |
| Connector Type                          | Hitec 3P (JR 3P compatible)                                                          |                     |
| Position Sensor Type                    | Indirect Drive / 4 Slider / 1M Cylce Long Life                                       |                     |
| Motor Type                              | BLDC                                                                                 |                     |
| Amplifier / MCU                         | 16bit programmable Digital Amplifier with Mosfet Drive                               |                     |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                                                          |                     |
| Operating Voltage                       | At 6.0V                                                                              | At 7.4V             |
| Operating Speed at no Load              | 333°/s (56RPM)                                                                       | 400°/s (67RPM)      |
| Stall Torque                            | 26.0kgcm (255.1Ncm)                                                                  | 26.0kgcm (255.1Ncm) |
| Peak Efficiency Torque                  | 5.2kgcm (51.0Ncm)                                                                    | 5.2kgcm (51.0Ncm)   |
| Rest Current                            | 30mA                                                                                 | 30mA                |
| Running Current at no Load              | 360mA                                                                                | 430mA               |
| Stall Current                           | 1300mA                                                                               | 1100mA              |
| Deadband Width                          | 1µs                                                                                  | 1µs                 |
| Operating Travel                        | Default                                                                              | ±60°                |
|                                         | Programmable                                                                         | Max. 160° **        |
|                                         | Multi Turn/Continuous Rotation                                                       | n/a / n/a           |
| Operating Temperature Range             | -20°C ~ +60°C (-4°F ~ +140°F)                                                        |                     |
| Storage Temperature Range               | -30°C ~ +80°C (-22°F ~+176°F)                                                        |                     |
| Connector Wire Length                   | 300mm                                                                                |                     |
| Connector Wire Gauge                    | 20AWG                                                                                |                     |
| Connector Wire Strand Count             | 80/0.08                                                                              |                     |
| External Dimensions                     | 40.0 x 20.0 x 37.7mm                                                                 |                     |
| Weight*                                 | 62.0g                                                                                |                     |
| Ball Bearing                            | Dual Ball Bearing                                                                    |                     |
| Case Material                           | Engineering Plastic                                                                  |                     |
| Gear Material                           | 1 Metal-Plastic & 3 Steel Gears                                                      |                     |
| Gear Train Backlash                     | Max. 0.5°                                                                            |                     |
| Horn Gear Spline                        | H25T Ø6.0                                                                            |                     |
| Accessories                             | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25) |                     |
| IP-Rating                               | IP54                                                                                 |                     |
| Revision                                | Rev. 1.1 / 03.01.2024                                                                |                     |
| Changelog                               | -                                                                                    |                     |
|                                         |                                                                                      |                     |
| *of the servo w/o horns and accessories |                                                                                      |                     |
| ** also available with 270°             |                                                                                      |                     |
|                                         |                                                                                      |                     |

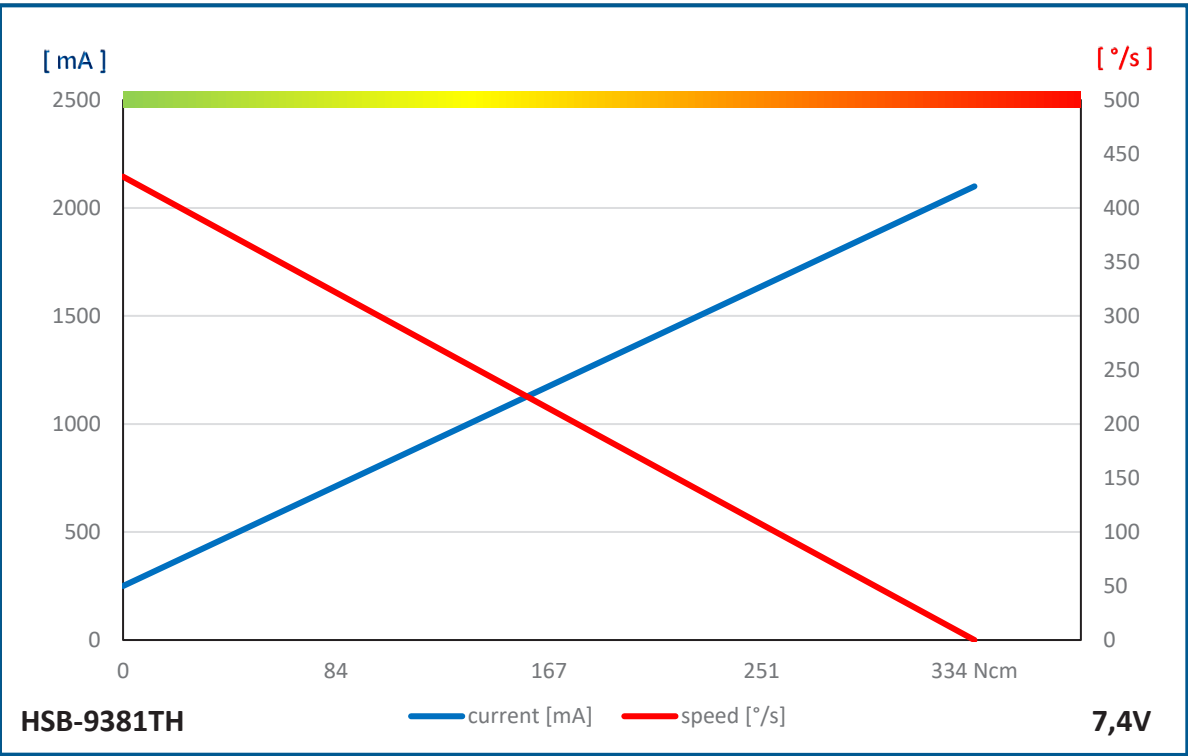
HSB-9381TH

#1-00074  
#1-02357 GP 24 Stück



1:1

PERFORMANCE CHART

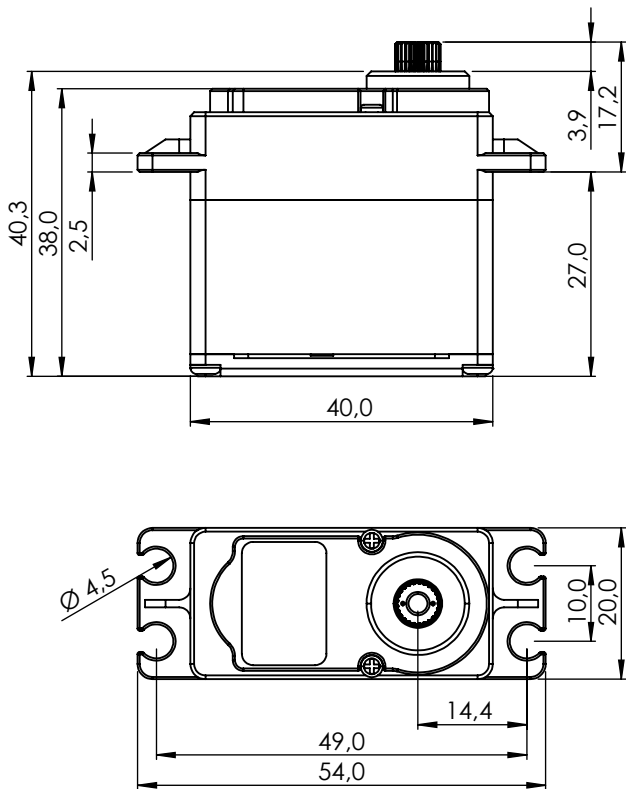


GENERAL SPECIFICATION

| HSB-9381TH                              |                                                                    |                     |
|-----------------------------------------|--------------------------------------------------------------------|---------------------|
| Control System                          | PWM                                                                |                     |
|                                         | Pulse Width 900µs 1500µs (Center) 2100µs                           |                     |
| Connector Type                          | Hitec 3P (JR 3P compatible)                                        |                     |
| Position Sensor Type                    | Indirect Drive / 4 Slider / 1M Cycle Long Life                     |                     |
| Motor Type                              | BLDC                                                               |                     |
| Amplifier / MCU                         | 16bit programmable Digital                                         |                     |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                                        |                     |
| Operating Voltage                       | At 6.0V                                                            | At 7.4V             |
| Operating Speed at no Load              | 353°/s (59RPM)                                                     | 429°/s (71RPM)      |
| Stall Torque                            | 34.0kgcm (333.5Ncm)                                                | 34.0kgcm (333.5Ncm) |
| Peak Efficiency Torque                  | 6.8kgcm (66.7Ncm)                                                  | 6.8kgcm (66.7Ncm)   |
| Rest Current                            | 27mA                                                               | 27mA                |
| Running Current at no Load              | 250mA                                                              | 250mA               |
| Stall Current                           | 2700mA                                                             | 2100mA              |
| Deadband Width                          | 1µs                                                                | 1µs                 |
| Operating Travel                        | Default                                                            | ±60°                |
|                                         | Programmable                                                       | Max. 160°           |
|                                         | Multi Turn/Continuous Rotation                                     | n/a / n/a           |
| Operating Temperature Range             | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |
| Storage Temperature Range               | -30°C ~ +80°C (-31°F ~ +176°F)                                     |                     |
| Connector Wire Length                   | 300mm                                                              |                     |
| Connector Wire Gauge                    | 20AWG                                                              |                     |
| Connector Wire Strand Count             | 80/0.08                                                            |                     |
| External Dimensions                     | 40.0 x 20.0 x 38.0mm                                               |                     |
| Weight*                                 | 79.0g                                                              |                     |
| Ball Bearing                            | Dual Ball Bearing                                                  |                     |
| Case Material                           | Aluminum Alloy                                                     |                     |
| Gear Material                           | 1 Metal-Plastic & 3 Titanium Alloy Gears                           |                     |
| Gear Train Backlash                     | Max 0.5°                                                           |                     |
| Horn Gear Spline                        | H25T Ø6.0                                                          |                     |
| Accessories                             | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |
| IP-Rating                               | IP54                                                               |                     |
| Revision                                | Rev. 1.1 / 03.01.2024                                              |                     |
| Changelog                               | -                                                                  |                     |
|                                         |                                                                    |                     |
| *of the servo w/o horns and accessories |                                                                    |                     |

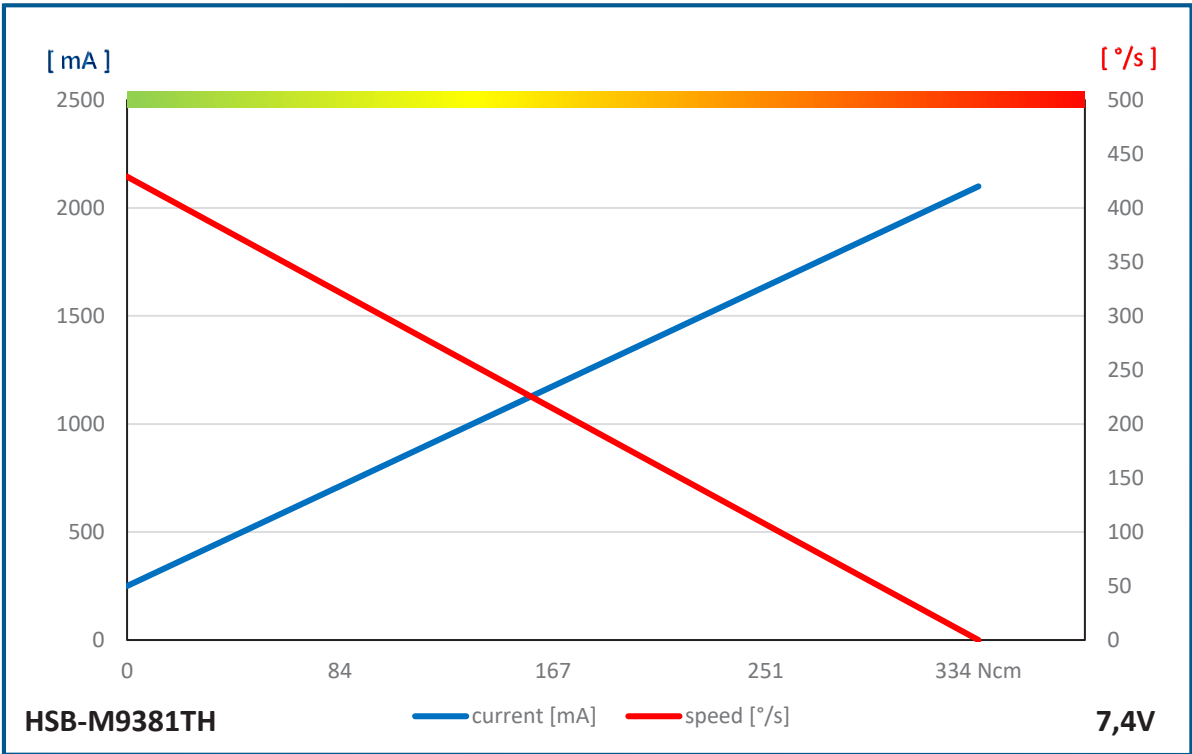
HSB-M9381TH

#1-01191  
#1-02353 GP 24 Stück



1:1

PERFORMANCE CHART



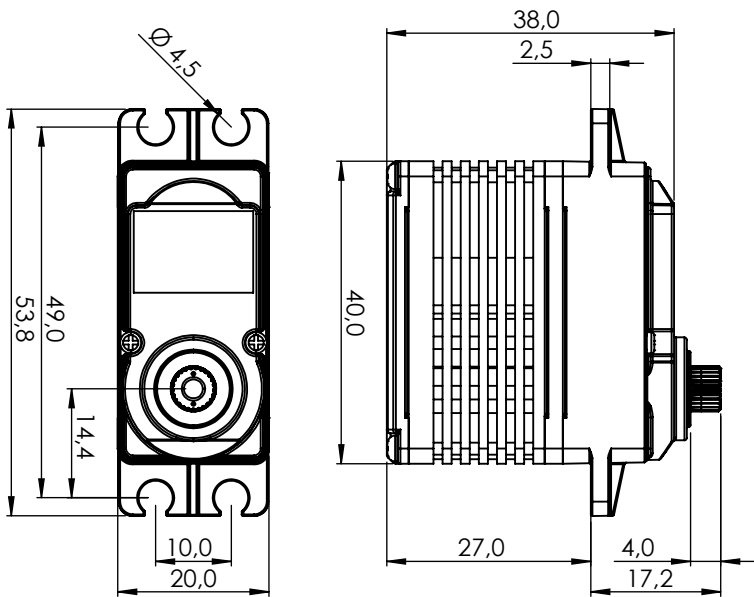
GENERAL SPECIFICATION

| HSB-M9381TH                             |                                                                    |                     |
|-----------------------------------------|--------------------------------------------------------------------|---------------------|
| Control System                          | PWM                                                                |                     |
|                                         | Pulse Width 900µs 1500µs (Center) 2100µs                           |                     |
| Connector Type                          | Hitec 3P (JR 3P compatible)                                        |                     |
| Position Sensor Type                    | Contactless Magnetic Encoder                                       |                     |
| Motor Type                              | BLDC                                                               |                     |
| Amplifier / MCU                         | 16bit programmable Digital Amplifier with Mosfet Drive             |                     |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                                        |                     |
| Operating Voltage                       | At 6.0V                                                            | At 7.4V             |
| Operating Speed at no Load              | 353°/s (59RPM)                                                     | 429°/s (71RPM)      |
| Stall Torque                            | 34.0kgcm (333.5Ncm)                                                | 34.0kgcm (333.5Ncm) |
| Peak Efficiency Torque                  | 6.8kgcm (66.7Ncm)                                                  | 6.8kgcm (66.7Ncm)   |
| Rest Current                            | 27mA                                                               | 27mA                |
| Running Current at no Load              | 250mA                                                              | 250mA               |
| Stall Current                           | 2700mA                                                             | 2100mA              |
| Deadband Width                          | 1µs                                                                | 1µs                 |
| Operating Travel                        | Default                                                            | ±60°                |
|                                         | Programmable                                                       | Max. 300°           |
|                                         | Multi Turn/Continuous Rotation                                     | n/a / n/a           |
| Operating Temperature Range             | -20°C ~ +70°C (-4°F ~ +158°F)                                      |                     |
| Storage Temperature Range               | -30°C ~ +80°C (-22°F ~+176°F)                                      |                     |
| Connector Wire Length                   | 300mm                                                              |                     |
| Connector Wire Gauge                    | 20AWG                                                              |                     |
| Connector Wire Strand Count             | 80/0.08                                                            |                     |
| External Dimensions                     | 40.0 x 20.0 x 38.0mm                                               |                     |
| Weight*                                 | 78.0g                                                              |                     |
| Ball Bearing                            | Dual Ball Bearing                                                  |                     |
| Case Material                           | Aluminum Alloy                                                     |                     |
| Gear Material                           | 1 Metal-Plastic & 3 Titanium Alloy Gears                           |                     |
| Gear Train Backlash                     | Max 0.5°                                                           |                     |
| Horn Gear Spline                        | H25T Ø6.0                                                          |                     |
| Accessories                             | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |
| IP-Rating                               | IP54                                                               |                     |
| Revision                                | Rev. 1.1 / 03.01.2024                                              |                     |
| Changelog                               | -                                                                  |                     |
|                                         |                                                                    |                     |
| *of the servo w/o horns and accessories |                                                                    |                     |
|                                         |                                                                    |                     |



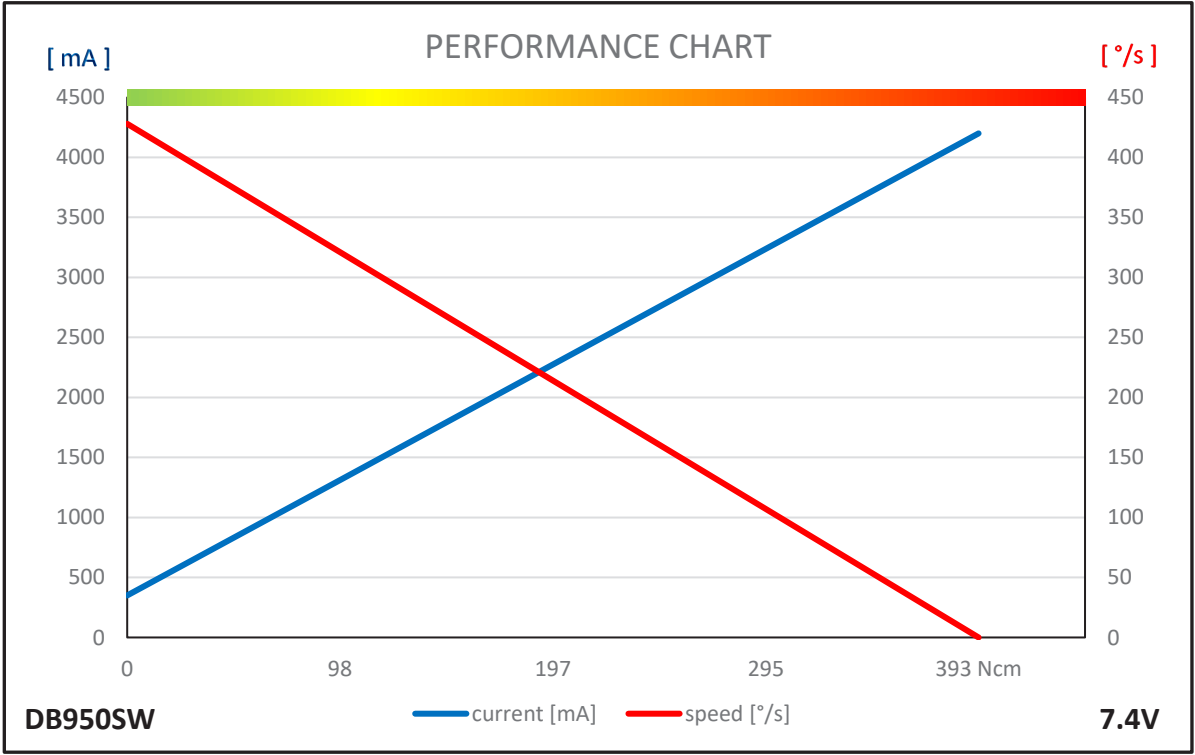
DB950SW

# 1-03218



GENERAL SPECIFICATION

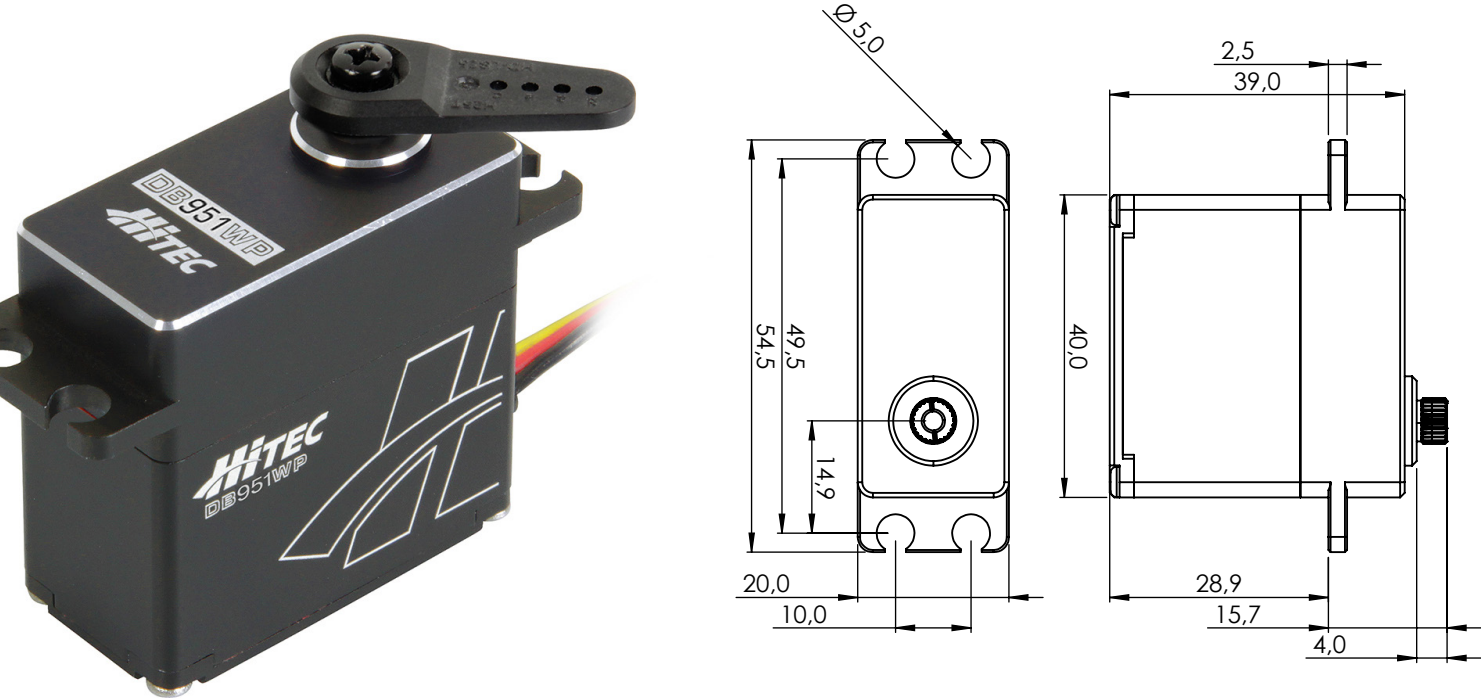
| DB950SW                     |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contact Analog Potentiometer                                                   |                          |                          |
| Motor Type                  | BLDC                                                                           |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | 4.8V                                                                           | 6.0V                     | 7.4V                     |
| No Load Speed               | 0.23sec/60°                                                                    | 0.18sec/60°              | 0.14sec/60°              |
| Stall Torque                | 35.0kgf·cm (486.06oz·in)                                                       | 40.0kgf·cm (555.5 oz·in) | 40.0kgf·cm (555.5 oz·in) |
| Peak Efficiency Torque      | 7.0kgf·cm (97.21oz·in)                                                         | 8.0kgf·cm (111.1 oz·in)  | 8.0kgf·cm (111.1 oz·in)  |
| Standing Current            | 35mA                                                                           | 35mA                     | 35mA                     |
| No Load Running Current     | 350mA                                                                          | 350mA                    | 350mA                    |
| Stall Current               | 5,000mA                                                                        | 5,000mA                  | 4,200mA                  |
| Deadband                    | 1μs                                                                            | 1μs                      | 1μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 175° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 38.5mm (1.575inch x 0.787inch x 1.516inch)                   |                          |                          |
| Weight                      | 68.0g (2.399oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering Plastic & Aluminum Heat Sink                                       |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Hardened Steel Gears                                       |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP54                                                                           |                          |                          |
| Servo Amplifier Type        | 32bit Programmable Digital                                                     |                          |                          |





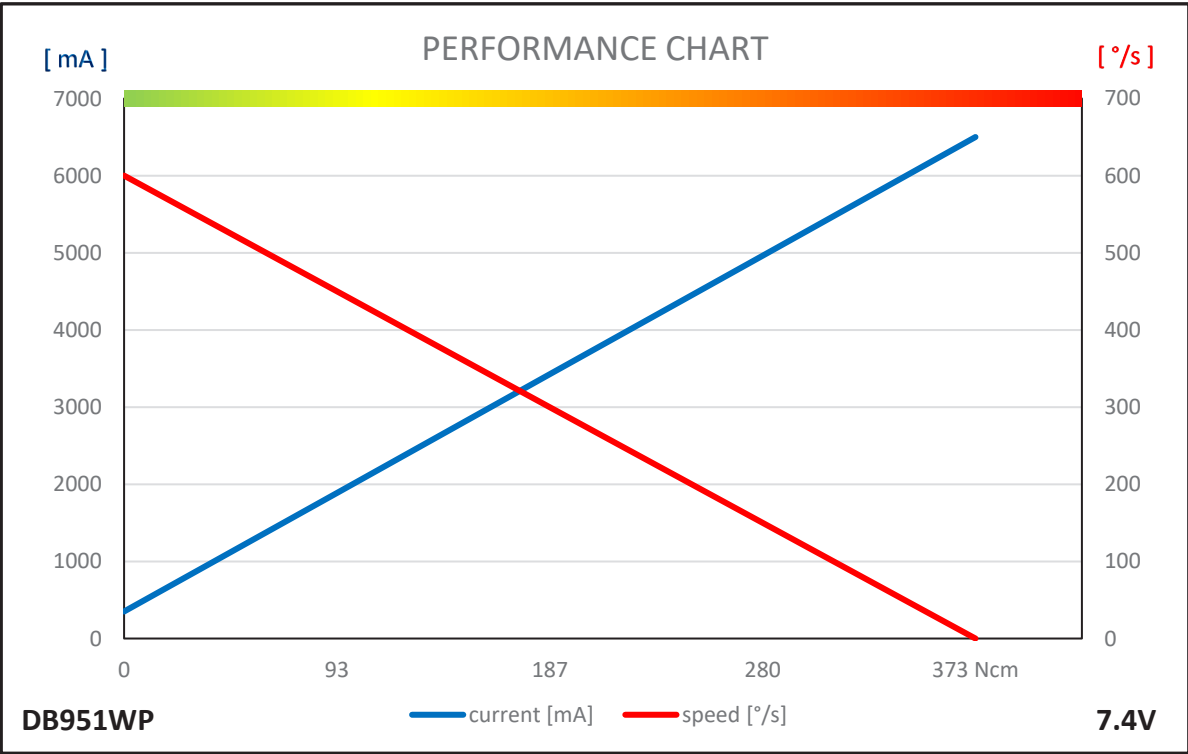
DB951WP

# 1-03088



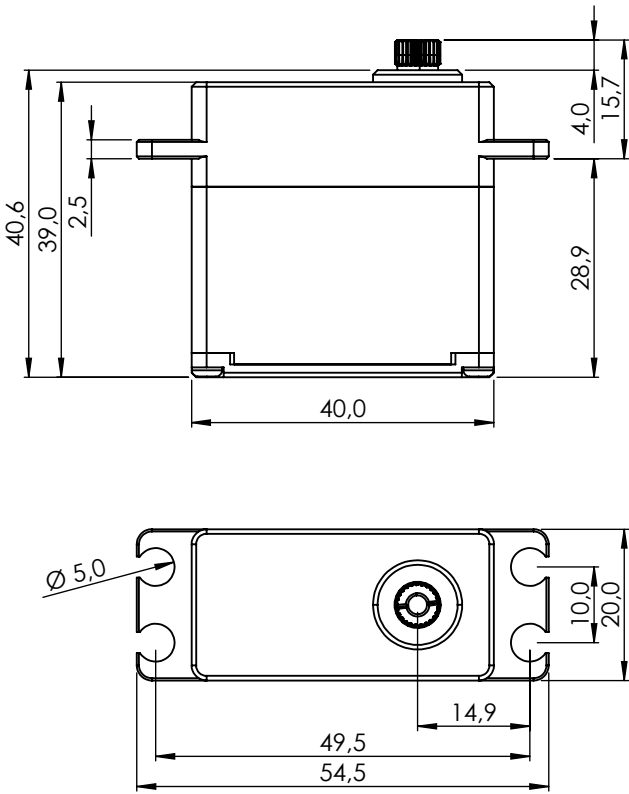
GENERAL SPECIFICATION

| DB951WP                     |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contact Analog Potentiometer                                                   |                          |                          |
| Motor Type                  | BLDC                                                                           |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.12sec/60°              | 0.10sec/60°              |
| Stall Torque                | -                                                                              | 38.0kgf·cm (527.72oz·in) | 38.0kgf·cm (527.72oz·in) |
| Peak Efficiency Torque      | -                                                                              | 7.6kgf·cm (105.54oz·in)  | 7.6kgf·cm (105.54oz·in)  |
| Standing Current            | -                                                                              | 35mA                     | 35mA                     |
| No Load Running Current     | -                                                                              | 350mA                    | 350mA                    |
| Stall Current               | -                                                                              | 8,000mA                  | 6,500mA                  |
| Deadband                    | -                                                                              | 1μs                      | 1μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 260° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch)                   |                          |                          |
| Weight                      | 90.0g (3.175oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Aluminum Alloy                                                                 |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                                         |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP67                                                                           |                          |                          |
| Servo Amplifier Type        | 16bit programmable Digital                                                     |                          |                          |

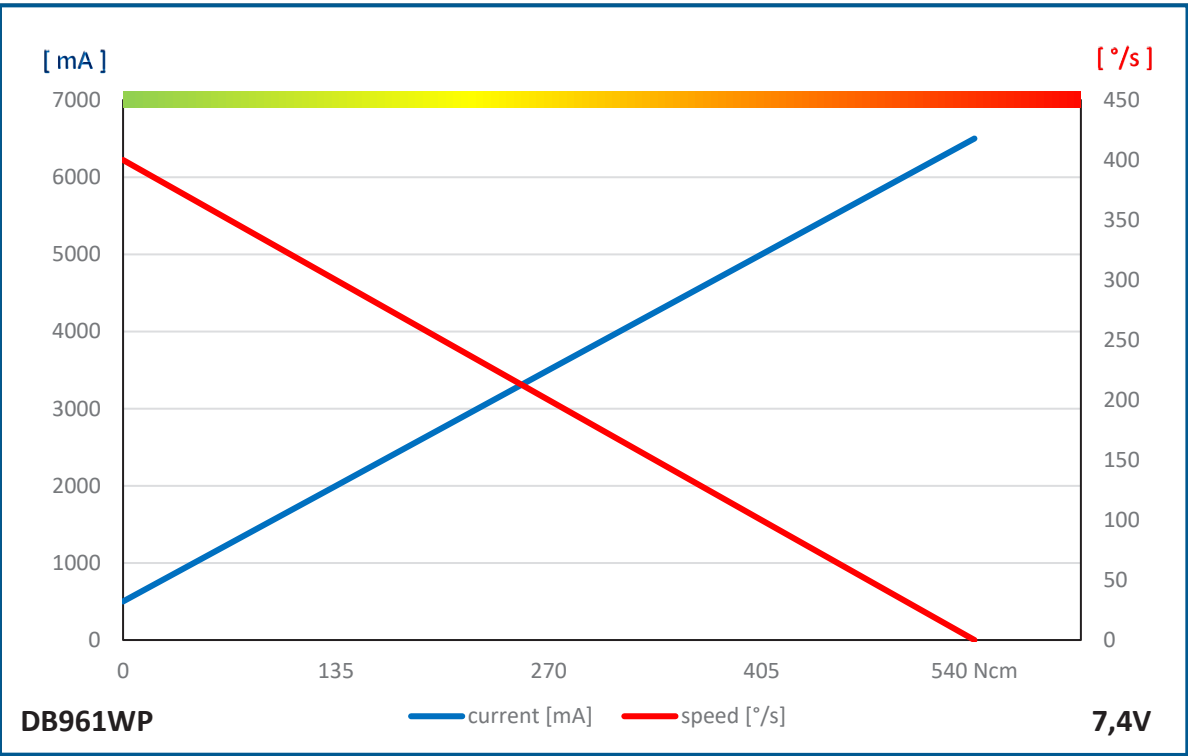


DB961WP

#1-02571



PERFORMANCE CHART

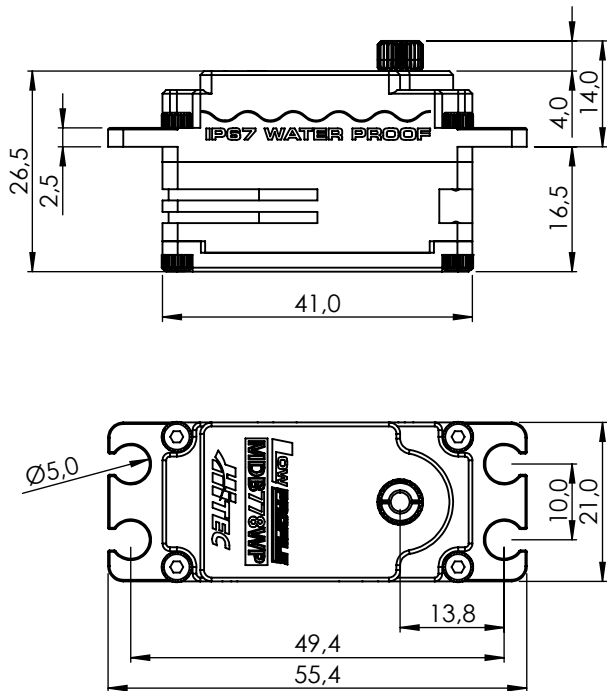


GENERAL SPECIFICATION

| DB961WP                                      |                                                      |                     |
|----------------------------------------------|------------------------------------------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                              |                     |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs             |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                          |                     |
| Position Sensor Type                         | Contact Analog Potentiometer                         |                     |
| Motor Type                                   | BLDC                                                 |                     |
| Amplifier / MCU                              | 16bit programmable Digital                           |                     |
| Operating Voltage Range                      | 4.0 ~ 8.4V                                           |                     |
| Operating Voltage                            | At 6.0V                                              | At 7.4V             |
| Operating Speed at no Load                   | 333°/s (56RPM)                                       | 400°/s (67RPM)      |
| Stall Torque                                 | 55.0kgcm (539.6Ncm)                                  | 55.0kgcm (539.6Ncm) |
| Peak Efficiency Torque                       | 11.0kgcm (107.9Ncm)                                  | 11.0kgcm (107.9Ncm) |
| Rest Current                                 | 35mA                                                 | 35mA                |
| Running Current at no Load                   | 500mA                                                | 500mA               |
| Stall Current                                | 8000mA                                               | 6500mA              |
| Deadband Width                               | 1µs                                                  | 1µs                 |
| Operating Travel                             | Default                                              | ±60°                |
|                                              | Programmable                                         | Max. 260°           |
|                                              | Multi Turn/Continuous Rotation                       | n/a / n/a           |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                        |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                        |                     |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII                              |                     |
| Connector Wire Length                        | 300mm                                                |                     |
| Connector Wire Gauge                         | 20AWG                                                |                     |
| Connector Wire Strand Count                  | 80/0.08                                              |                     |
| External Dimensions                          | 40.0 x 20.0 x 39.0mm                                 |                     |
| Weight*                                      | 90.0g                                                |                     |
| Ball Bearing                                 | Dual Ball Bearing                                    |                     |
| Case Material                                | Aluminum Alloy                                       |                     |
| Gear Material                                | 5 Hardened Steel Gears                               |                     |
| Gear Train Backlash                          | Max. 0.5°                                            |                     |
| Horn Gear Spline                             | H25T Ø6.0                                            |                     |
| Accessories                                  | Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25 |                     |
| IP-Rating                                    | IP67                                                 |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                |                     |
| Changelog                                    | -                                                    |                     |
|                                              |                                                      |                     |
| *of the servo only w/o horns and accessories |                                                      |                     |

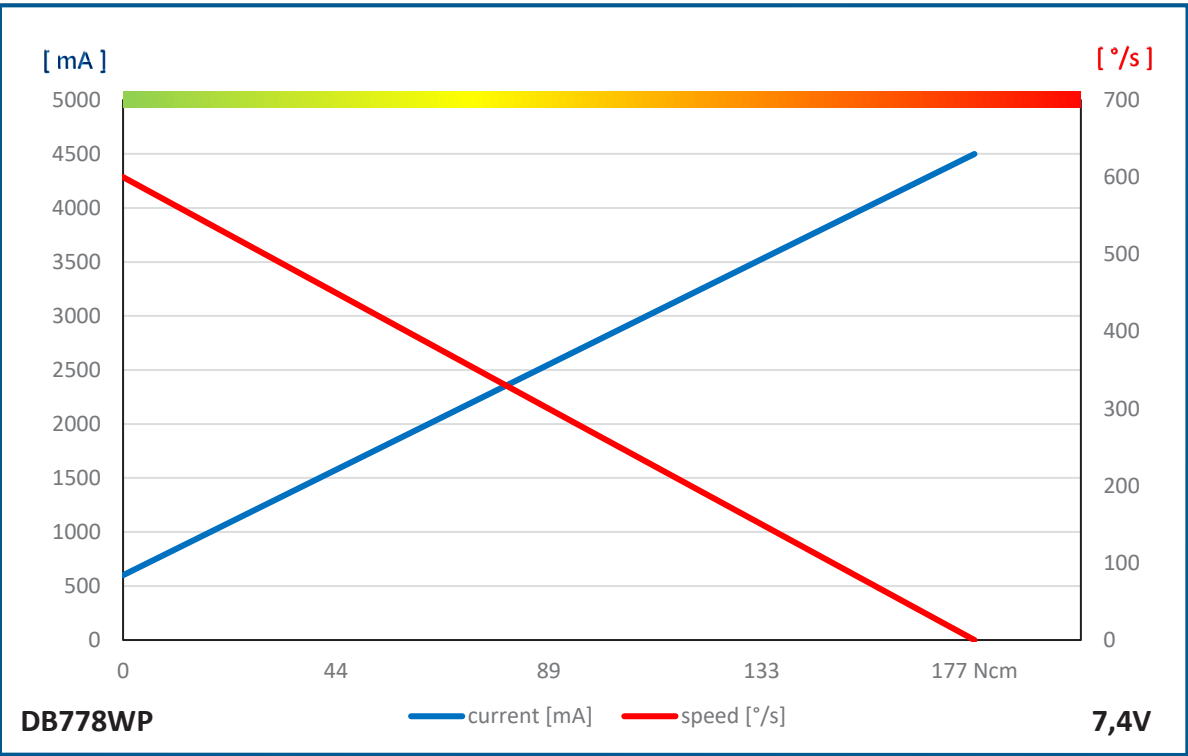
DB778WP

#1-02853



1:1

PERFORMANCE CHART

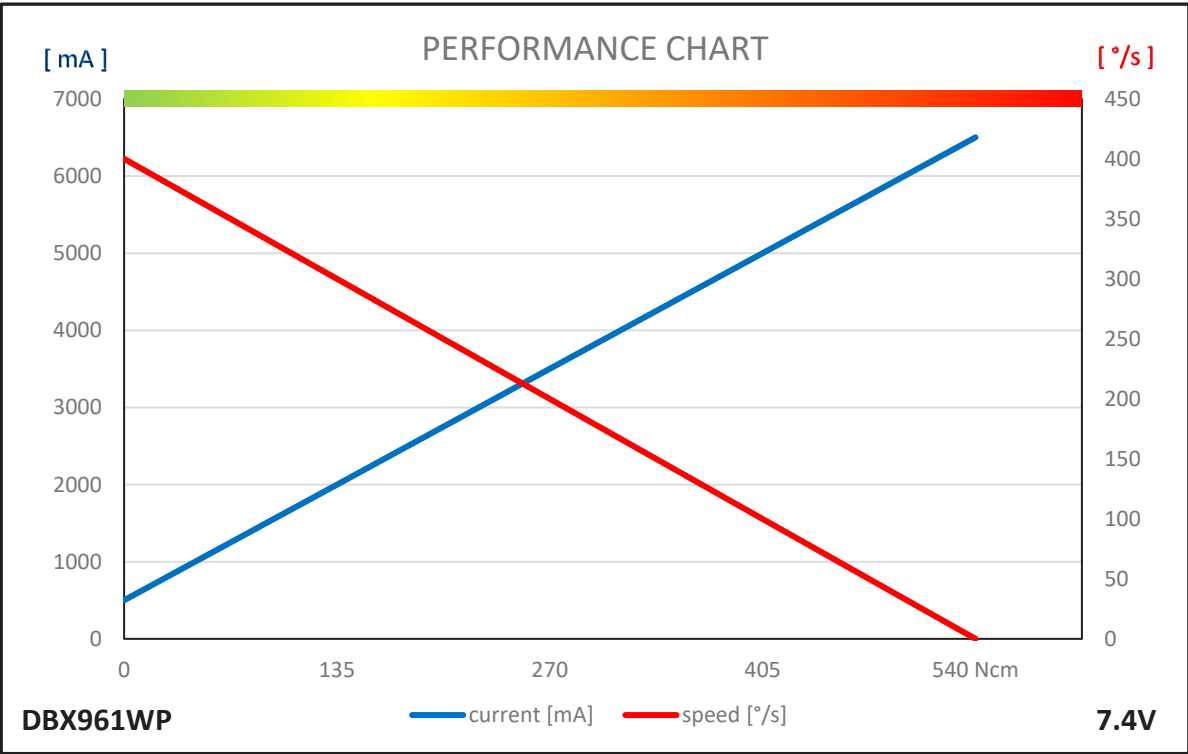
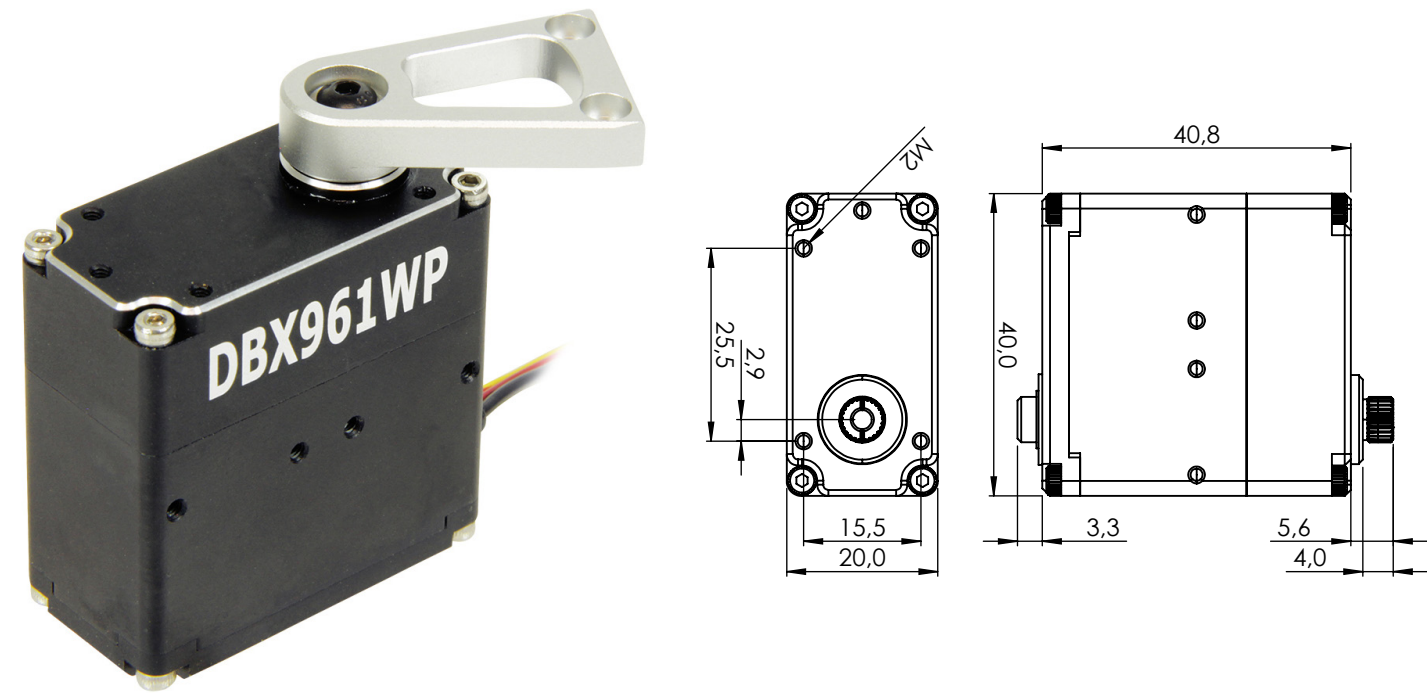


GENERAL SPECIFICATION

| DB778WP                                      |                                                            |                     |
|----------------------------------------------|------------------------------------------------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                                    |                     |
|                                              | Pulse Width    900µs 1500µs (Center) 2100µs                |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                |                     |
| Position Sensor Type                         | Contact Analog Potentiometer                               |                     |
| Motor Type                                   | BLDC                                                       |                     |
| Amplifier / MCU                              | 32bit programmable Digital                                 |                     |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                                |                     |
| Operating Voltage                            | At 6.0V                                                    | At 7.4V             |
| Operating Speed at no Load                   | 500°/s (83RPM)                                             | 600°/s (100RPM)     |
| Stall Torque                                 | 15.0kgcm (147.2Ncm)                                        | 18.0kgcm (175.6Ncm) |
| Peak Efficiency Torque                       | 3.0kgcm (29.4Ncm)                                          | 3.6kgcm (35.3Ncm)   |
| Rest Current                                 | 28mA                                                       | 28mA                |
| Running Current at no Load                   | 500mA                                                      | 600mA               |
| Stall Current                                | 3500mA                                                     | 4500mA              |
| Deadband Width                               | 1µs                                                        | 1µs                 |
| Operating Travel                             | Default                                                    | ±60°                |
|                                              | Programmable                                               | Max. 175°           |
|                                              | Multi Turn/Continuous Rotation                             | n/a / n/a           |
| Operating Temperature Range                  | -20°C ~ +70°C (-4°F ~ +158°F)                              |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                              |                     |
| Vibrations at no Load                        | -                                                          |                     |
| Connector Wire Length                        | 200mm                                                      |                     |
| Connector Wire Gauge                         | 20AWG                                                      |                     |
| Connector Wire Strand Count                  | 80/0.08                                                    |                     |
| External Dimensions                          | 41.0 x 21.0 x 26.5mm                                       |                     |
| Weight*                                      | 66.0g                                                      |                     |
| Ball Bearing                                 | Dual Ball Bearing                                          |                     |
| Case Material                                | Rugged Aluminum Alloy                                      |                     |
| Gear Material                                | 5 Hardened Steel   Gears                                   |                     |
| Gear Train Backlash                          | Max. 0.5°                                                  |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                  |                     |
| Accessories                                  | Hex Screw, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |
| IP-Rating                                    | IP67                                                       |                     |
| Revision                                     | Rev. 1.0 / 09.01.2024                                      |                     |
| Changelog                                    | -                                                          |                     |
|                                              |                                                            |                     |
| *of the servo only w/o horns and accessories |                                                            |                     |

DBX961WP

# 1-03226



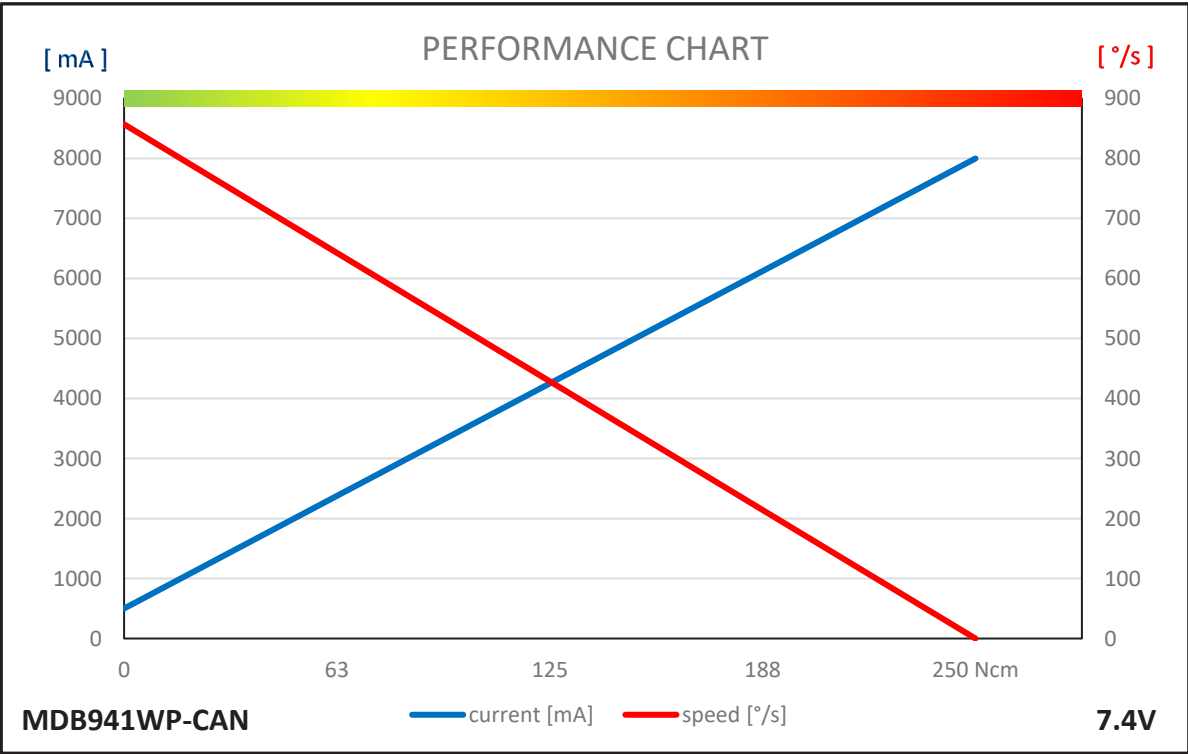
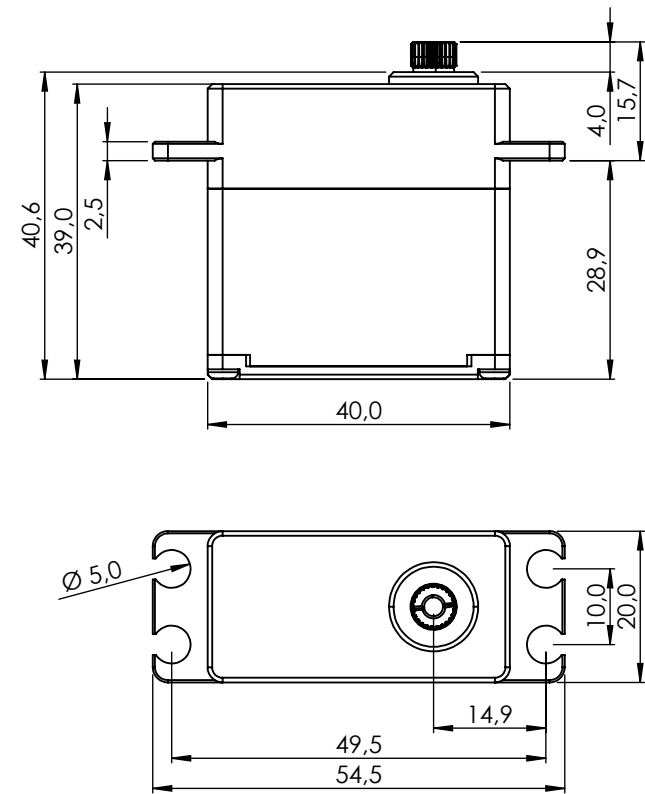
GENERAL SPECIFICATION

| DBX961WP                    |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contact Analog Potentiometer                                                   |                          |                          |
| Motor Type                  | BLDC                                                                           |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.18sec/60°              | 0.15sec/60°              |
| Stall Torque                | -                                                                              | 55.0kgf·cm (763.81oz-in) | 55.0kgf·cm (763.81oz-in) |
| Peak Efficiency Torque      | -                                                                              | 11.0kgf·cm (152.76oz-in) | 11.0kgf·cm (152.76oz-in) |
| Standing Current            | -                                                                              | 35mA                     | 35mA                     |
| No Load Running Current     | -                                                                              | 500mA                    | 500mA                    |
| Stall Current               | -                                                                              | 8,000mA                  | 6,500mA                  |
| Deadband                    | -                                                                              | 1μs                      | 1μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 260° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 40.8mm (1.575inch x 0.787inch x 1.606inch)                   |                          |                          |
| Weight                      | 106.7g (3.764oz)                                                               |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Rugged Aluminum Alloy                                                          |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                                         |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP67                                                                           |                          |                          |
| Servo Amplifier Type        | 16bit programmable Digital                                                     |                          |                          |



MDB941WP-CAN

# 1-03191



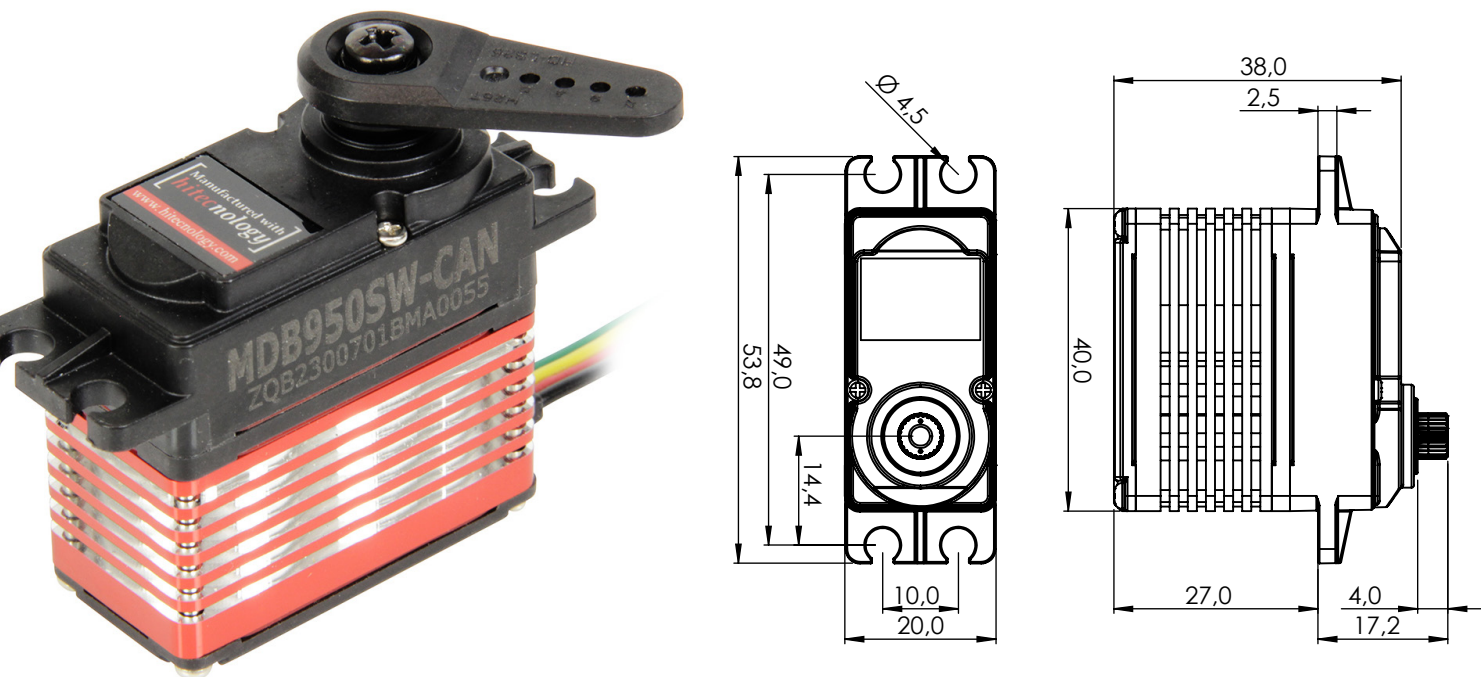
GENERAL SPECIFICATION

| MDB941WP-CAN                |                                                                            |                          |                          |
|-----------------------------|----------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | CAN 2.0A,B                                                                 |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                               |                          |                          |
| Motor Type                  | BLDC                                                                       |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                 |                          |                          |
| Voltage                     | -                                                                          | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                          | 0.085sec/60°             | 0.07sec/60°              |
| Stall Torque                | -                                                                          | 20.6kgf·cm (286.08oz-in) | 25.4kgf·cm (352.74oz-in) |
| Peak Efficiency Torque      | -                                                                          | 4.1kgf·cm (56.94oz-in)   | 5.1kgf·cm (70.83oz-in)   |
| Standing Current            | -                                                                          | 30mA                     | 30mA                     |
| No Load Running Current     | -                                                                          | 500mA                    | 500mA                    |
| Stall Current               | -                                                                          | 8,000mA                  | 8,000mA                  |
| Deadband                    | -                                                                          | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable) / Turn Mode : ±32760 Turns |                          |                          |
| Continuous Rotation         | n/a                                                                        |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                               |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                              |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                          |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                      |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch)               |                          |                          |
| Weight                      | 91.7g (3.235oz)                                                            |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                             |                          |                          |
| Case Material               | Aluminum Alloy                                                             |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                                     |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                   |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                    |                          |                          |
| IP-Rating                   | IP67                                                                       |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                                 |                          |                          |



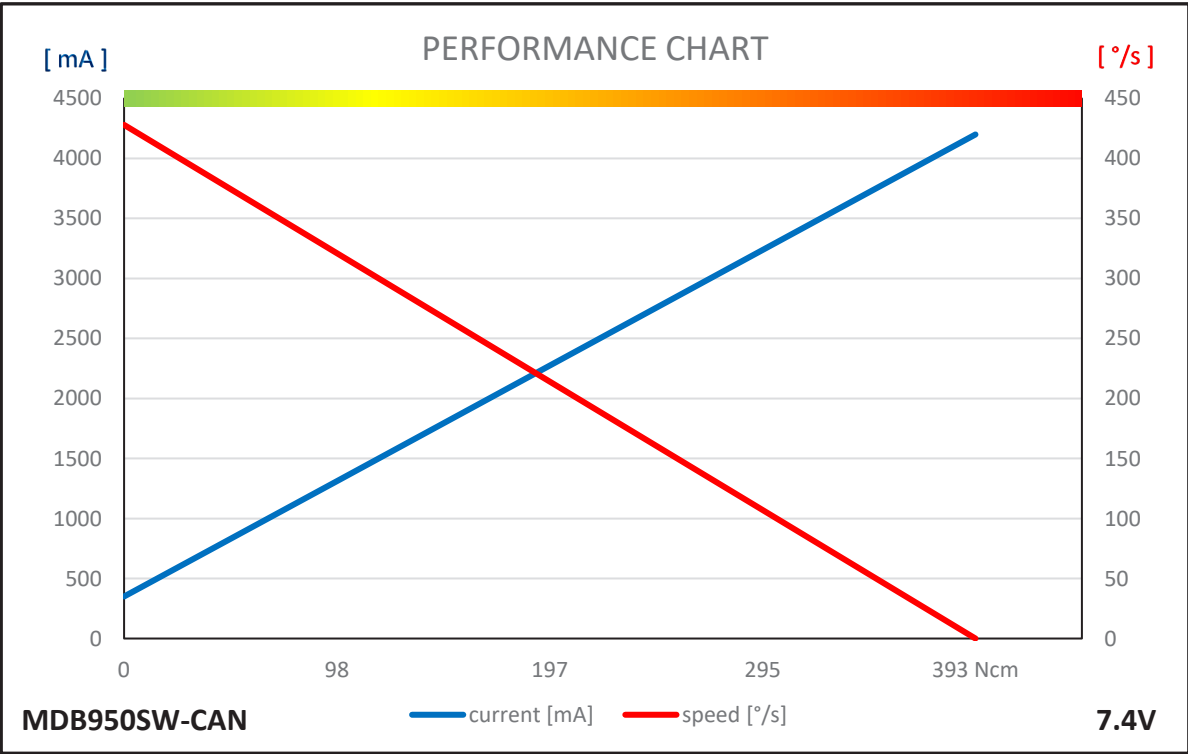
MDB950SW-CAN

# 1-03093



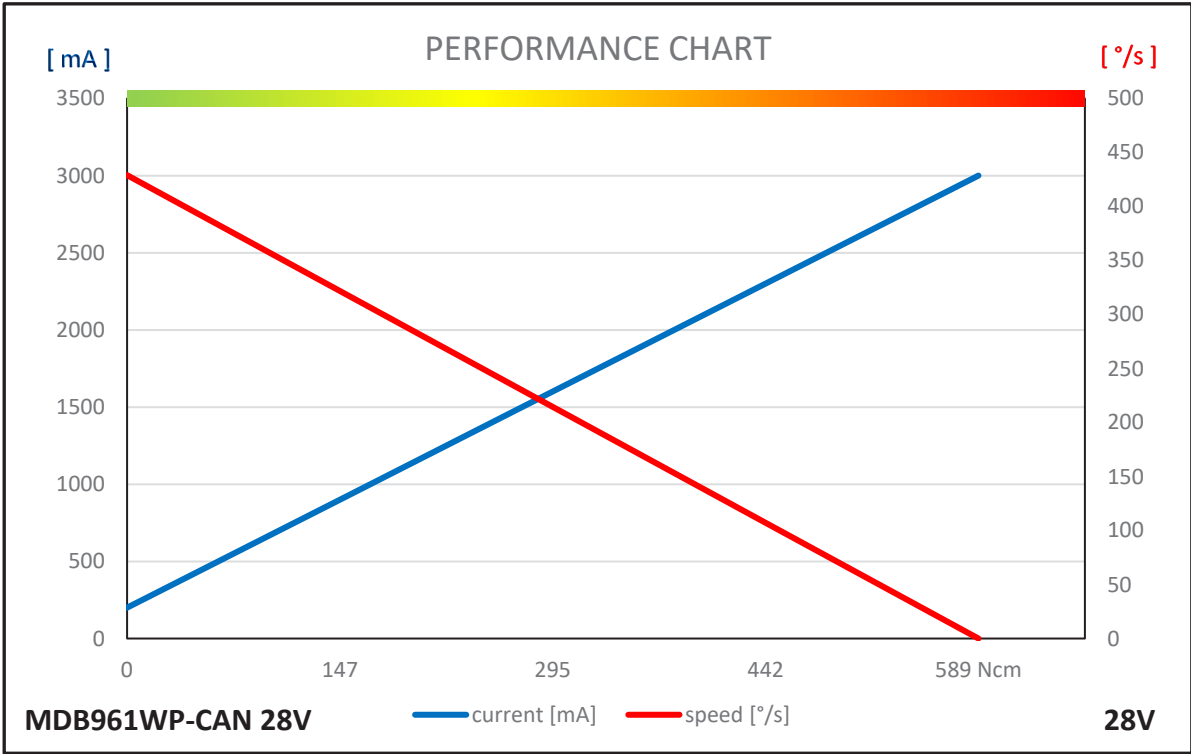
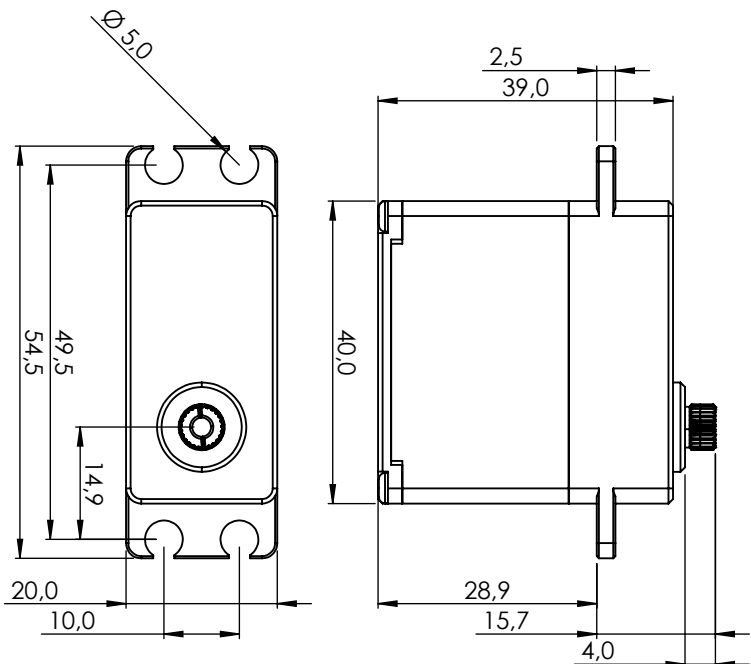
GENERAL SPECIFICATION

| MDB950SW-CAN                |                                                                            |                          |                          |
|-----------------------------|----------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | CAN 2.0A,B                                                                 |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                               |                          |                          |
| Motor Type                  | BLDC                                                                       |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                 |                          |                          |
| Voltage                     | 4.8V                                                                       | 6.0V                     | 7.4V                     |
| No Load Speed               | 0.23sec/60°                                                                | 0.18sec/60°              | 0.14sec/60°              |
| Stall Torque                | 35.0kgf·cm (486.06oz·in)                                                   | 40.0kgf·cm (555.5 oz·in) | 40.0kgf·cm (555.5 oz·in) |
| Peak Efficiency Torque      | 7.0kgf·cm (97.21oz·in)                                                     | 8.0kgf·cm (111.1 oz·in)  | 8.0kgf·cm (111.1 oz·in)  |
| Standing Current            | 30mA                                                                       | 30mA                     | 30mA                     |
| No Load Running Current     | 350mA                                                                      | 350mA                    | 350mA                    |
| Stall Current               | 5,000mA                                                                    | 5,000mA                  | 4,200mA                  |
| Deadband                    | n/a                                                                        | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable) / Turn Mode : ±32760 Turns |                          |                          |
| Continuous Rotation         | n/a                                                                        |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                               |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                              |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                          |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                      |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 38.5mm (1.575inch x 0.787inch x 1.516inch)               |                          |                          |
| Weight                      | 70.7g (2.494oz)                                                            |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                             |                          |                          |
| Case Material               | Engineering Plastic & Aluminum Heat Sink                                   |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Hardened Steel Gears                                   |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                   |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                    |                          |                          |
| IP-Rating                   | IP54                                                                       |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                                 |                          |                          |



MDB961WP-CAN

# 1-03004

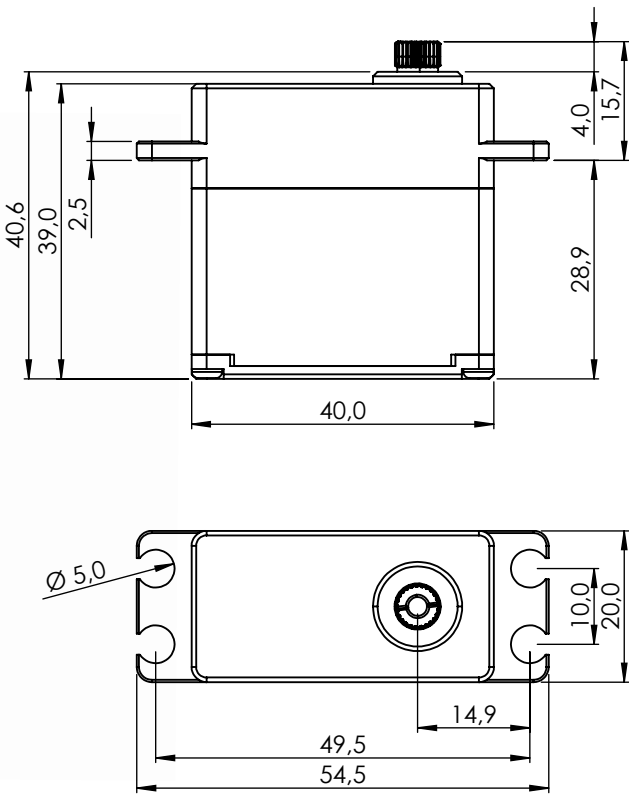


GENERAL SPECIFICATION

| MDB961WP-CAN                |                                                                            |                          |                          |
|-----------------------------|----------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | CAN 2.0A,B                                                                 |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                               |                          |                          |
| Motor Type                  | BLDC                                                                       |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                 |                          |                          |
| Voltage                     | -                                                                          | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                          | 0.18sec/60°              | 0.15sec/60°              |
| Stall Torque                | -                                                                          | 55.0kgf·cm (763.81oz-in) | 55.0kgf·cm (763.81oz-in) |
| Peak Efficiency Torque      | -                                                                          | 11.0kgf·cm (152.76oz-in) | 11.0kgf·cm (152.76oz-in) |
| Standing Current            | -                                                                          | 30mA                     | 30mA                     |
| No Load Running Current     | -                                                                          | 500mA                    | 500mA                    |
| Stall Current               | -                                                                          | 8,000mA                  | 6,500mA                  |
| Deadband                    | -                                                                          | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable) / Turn Mode : ±32760 Turns |                          |                          |
| Continuous Rotation         | n/a                                                                        |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                               |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                              |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                          |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                      |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch)               |                          |                          |
| Weight                      | 90.0g (3.175oz)                                                            |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                             |                          |                          |
| Case Material               | Aluminum Alloy                                                             |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                                     |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                   |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                    |                          |                          |
| IP-Rating                   | IP67                                                                       |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                                 |                          |                          |

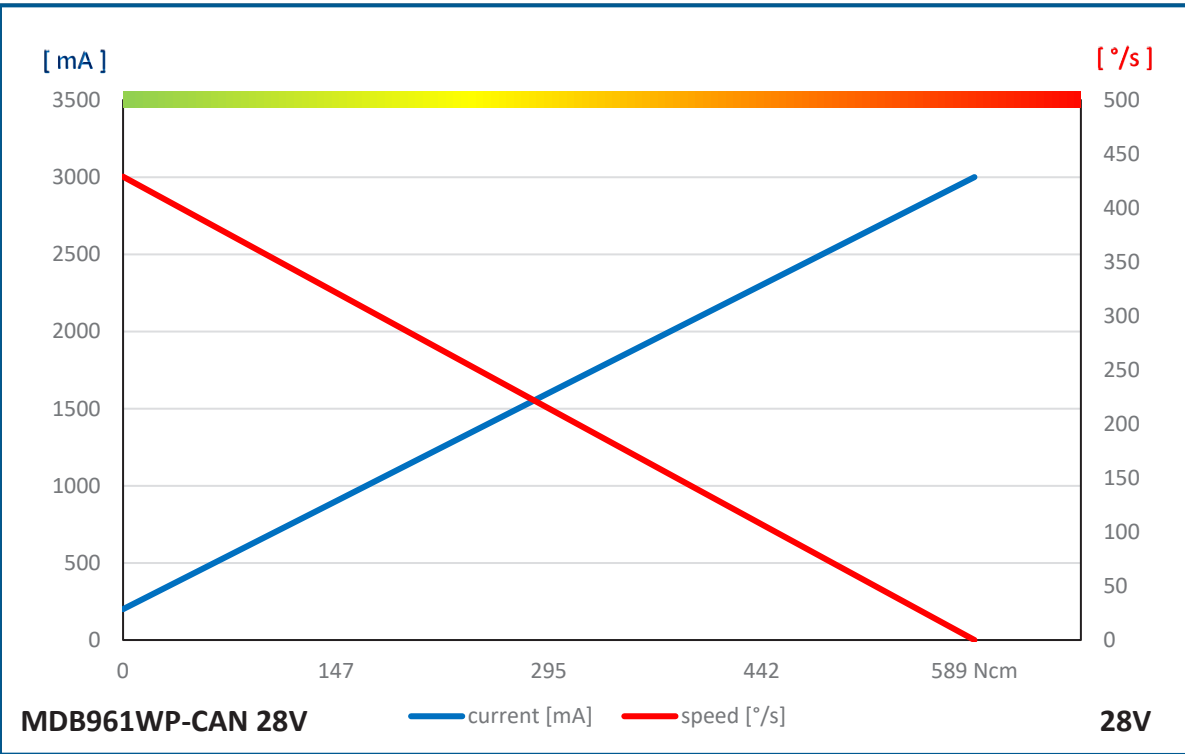
MDB961WP-CAN 28V

#1-03003



1:1

PERFORMANCE CHART



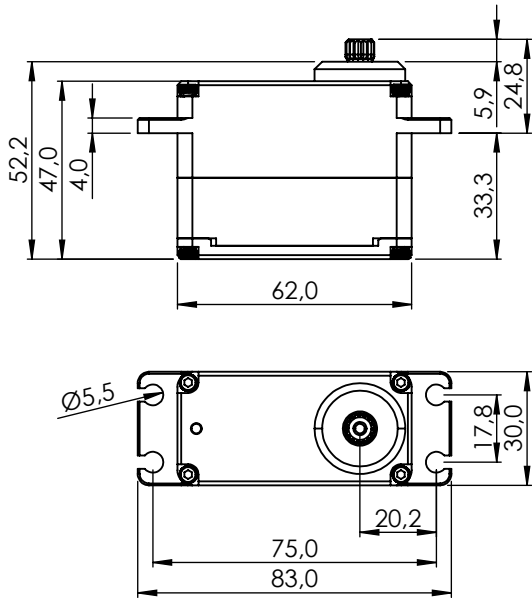
GENERAL SPECIFICATION

| MDB961WP-CAN 28V                             |                                                           |                     |                     |               |
|----------------------------------------------|-----------------------------------------------------------|---------------------|---------------------|---------------|
| Control System                               | CAN BUS                                                   |                     |                     |               |
|                                              | Protocol (Mode)                                           | Standard 2.0A       |                     | Extended 2.0B |
|                                              | Baud-Rate                                                 | 10kbps ~ 1Mbps      |                     |               |
|                                              | Sample-Point                                              | 50% or 87.5%        |                     |               |
|                                              | Available SERVO ID                                        | 1 ~ 254             |                     | 1 ~ 127       |
|                                              | Available Node ID                                         | 1 ~ 2047            | 1 ~ 536870911       | 1 ~ 127       |
|                                              | Input Signal Range                                        | 0 ~ 5V              |                     |               |
| Connector Type                               | Hitec 4P                                                  |                     |                     |               |
| Position Sensor Type                         | Contactless Magnetic Encoder                              |                     |                     |               |
| Motor Type                                   | BLDC                                                      |                     |                     |               |
| Amplifier / MCU                              | 32bit programmable Digital                                |                     |                     |               |
| Operating Voltage Range                      | 8.0V ~ 32.0V                                              |                     |                     |               |
| Operating Voltage                            | At 12.0V                                                  | At 24.0V            | At 28.0V            |               |
| Operating Speed at no Load                   | 429°/s (71RPM)                                            | 429°/s (71RPM)      | 429°/s (71RPM)      |               |
| Stall Torque                                 | 60.0kgcm (588.6Ncm)                                       | 60.0kgcm (588.6Ncm) | 60.0kgcm (588.6Ncm) |               |
| Peak Efficiency Torque                       | 12.0kgcm (117.7Ncm)                                       | 12.0kgcm (117.7Ncm) | 12.0kgcm (117.7Ncm) |               |
| Rest Current                                 | 18mA                                                      | 10mA                | 9mA                 |               |
| Running Current at no Load                   | 500mA                                                     | 300mA               | 200mA               |               |
| Stall Current                                | 6700mA                                                    | 3400mA              | 3000mA              |               |
| Deadband Width                               | n/a                                                       | n/a                 | n/a                 |               |
| Travel                                       | Travel / Command                                          | 90° / 4096          |                     |               |
|                                              | Servo mode                                                | Left                | Center              | Right         |
|                                              | Pos Command                                               | +1366               | +8192               | +15018        |
|                                              | Pos [°]                                                   | -150                | 0                   | +150          |
|                                              | Turn Mode                                                 | Left                | Power On            | Right         |
|                                              | Pos Command                                               | -16383              | 0                   | +16383        |
|                                              | Pos [°]                                                   | -359                | 0                   | +359          |
| Turn Range                                   | -32760 ~ +32760                                           |                     |                     |               |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                             |                     |                     |               |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                            |                     |                     |               |
| Vibrations at no Load                        | -                                                         |                     |                     |               |
| Connector Wire Length                        | 300mm                                                     |                     |                     |               |
| Connector Wire Gauge                         | 20AWG                                                     |                     |                     |               |
| Connector Wire Strand Count                  | 80/0.08                                                   |                     |                     |               |
| External Dimensions                          | 40.0 x 20.0 x 39.0mm                                      |                     |                     |               |
| Weight*                                      | 90.0g                                                     |                     |                     |               |
| Ball Bearing                                 | Dual Ball Bearing                                         |                     |                     |               |
| Case Material                                | Aluminum Alloy                                            |                     |                     |               |
| Gear Material                                | 5 Hardened Steel Gears                                    |                     |                     |               |
| Gear Train Backlash                          | Max. 0.5°                                                 |                     |                     |               |
| Horn Gear Spline                             | H25T Ø6.0                                                 |                     |                     |               |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-OS25, HD-X25) |                     |                     |               |
| IP-Rating                                    | IP67                                                      |                     |                     |               |
| Revision                                     | Rev. 1.0 / 09.01.2024                                     |                     |                     |               |
| Changelog                                    | -                                                         |                     |                     |               |
|                                              |                                                           |                     |                     |               |
| *of the servo only w/o horns and accessories |                                                           |                     |                     |               |

\*of the servo only w/o horns and accessories

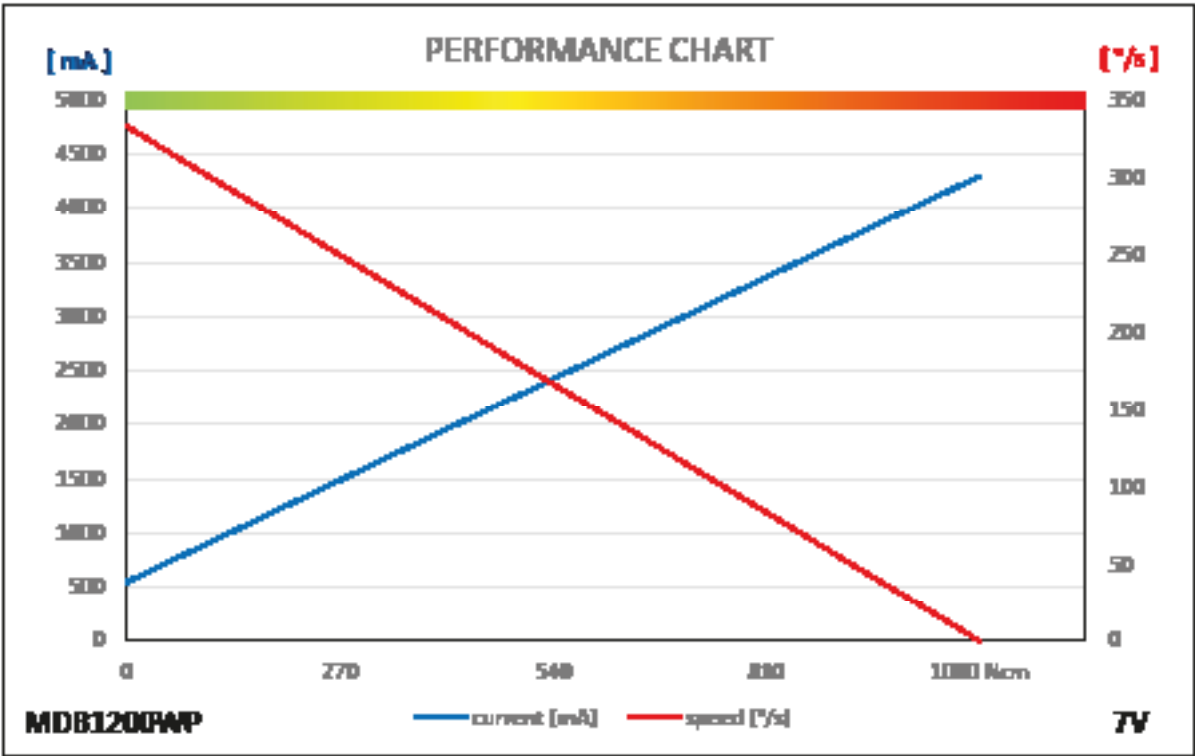
MDB1200WP

#1-03109



1:2

PERFORMANCE CHART



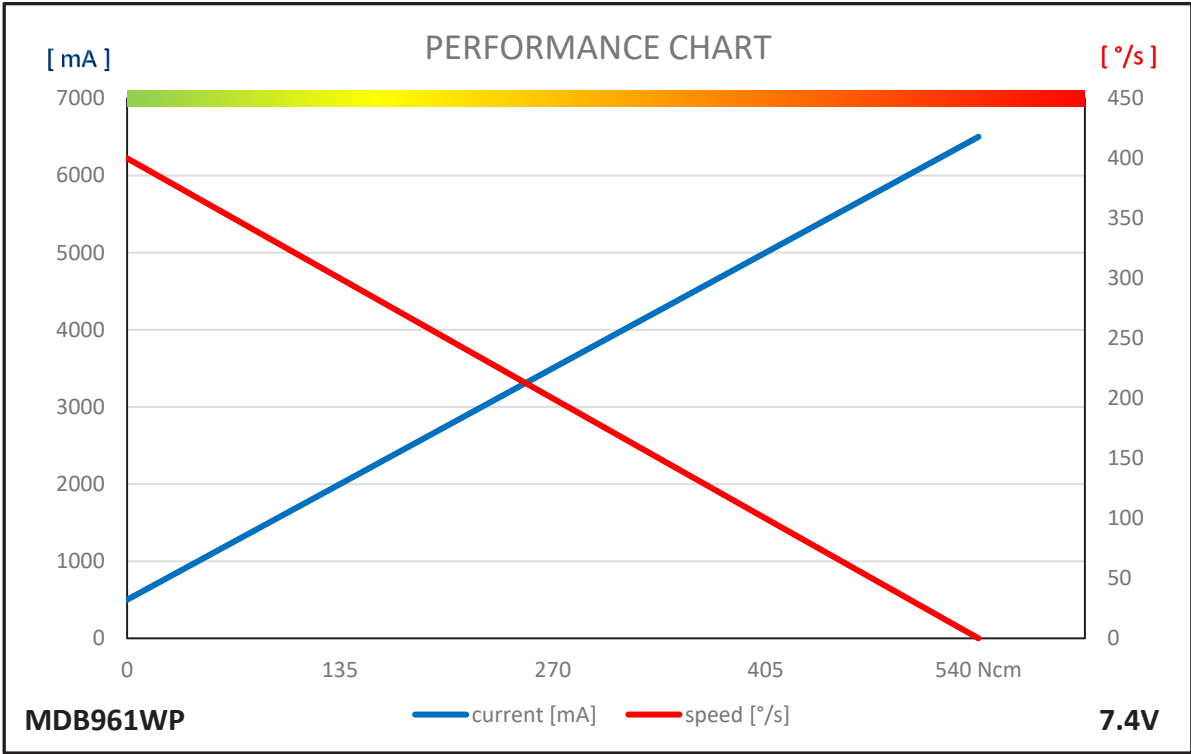
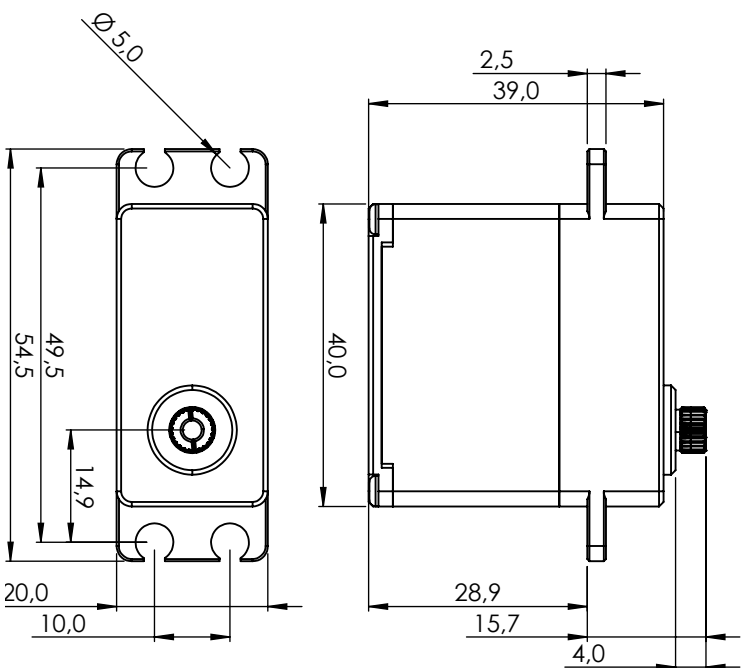
GENERAL SPECIFICATION

| MDB1200WP                                    |                                                 |                       |
|----------------------------------------------|-------------------------------------------------|-----------------------|
| Control System                               | PWM / TTL (Half Duplex)                         |                       |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs        |                       |
| Connector Type                               | Hitec 3P (JR 3P compatible)                     |                       |
| Position Sensor Type                         | Contactless Magnetic Encoder                    |                       |
| Motor Type                                   | BLDC                                            |                       |
| Amplifier / MCU                              | 32bit programmable Digital                      |                       |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                     |                       |
| Operating Voltage                            | At 6.0V                                         | At 7.0V               |
| Operating Speed at no Load                   | 273°/s (46RPM)                                  | 333°/s (56RPM)        |
| Stall Torque                                 | 100.0kgcm (981.0Ncm)                            | 110.0kgcm (1079.1Ncm) |
| Peak Efficiency Torque                       | 20.0kgcm (196.2Ncm)                             | 22.0kgcm (215.8Ncm)   |
| Rest Current                                 | 20mA                                            | 20mA                  |
| Running Current at no Load                   | 500mA                                           | 550mA                 |
| Stall Current                                | 5000mA                                          | 4300mA                |
| Deadband Width                               | 2µs                                             | 2µs                   |
| Operating Travel                             | Default                                         | ±60°                  |
|                                              | Programmable                                    | Max. 320°             |
|                                              | Multi Turn/Continuous Rotation                  | n/a / n/a             |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                   |                       |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                   |                       |
| Vibrations at no Load                        | -                                               |                       |
| Connector Wire Length                        | 300mm                                           |                       |
| Connector Wire Gauge                         | 20AWG                                           |                       |
| Connector Wire Strand Count                  | 80/0.08                                         |                       |
| External Dimensions                          | 62.0 x 30.0 x 47.0mm                            |                       |
| Weight*                                      | 260.0g                                          |                       |
| Ball Bearing                                 | 2 Ball Bearing & 2 Needle Bearing               |                       |
| Case Material                                | Aluminum Alloy                                  |                       |
| Gear Material                                | 5 Hardened Steel Gears                          |                       |
| Gear Train Backlash                          | Max. 0.5°                                       |                       |
| Horn Gear Spline                             | H15T Ø8.0                                       |                       |
| Accessories                                  | Mounting Hardware, Servo Horns (Q-OA15, Q-XA15) |                       |
| IP-Rating                                    | IP67                                            |                       |
| Revision                                     | Rev. 1.0 / 09.01.2024                           |                       |
| Changelog                                    | -                                               |                       |
|                                              |                                                 |                       |
| *of the servo only w/o horns and accessories |                                                 |                       |



MDB961WP

# 1-03225



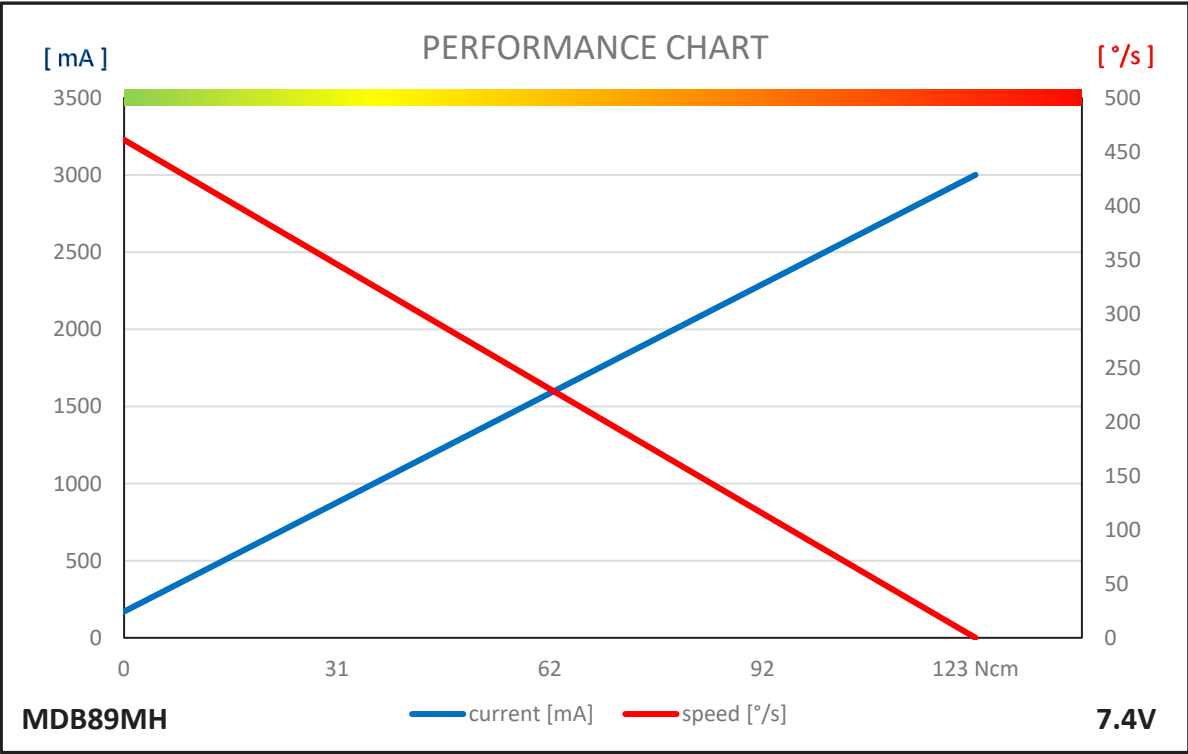
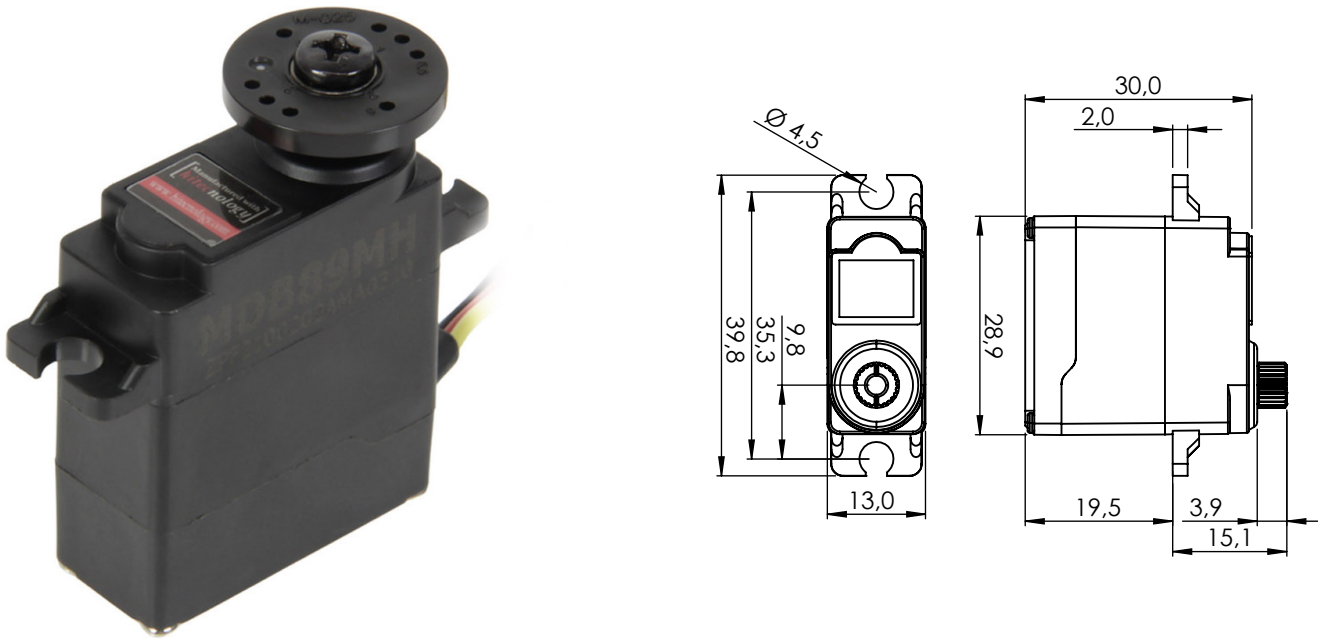
GENERAL SPECIFICATION

| MDB961WP                    |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                          |                          |
| Motor Type                  | BLDC                                                                           |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.18sec/60°              | 0.15sec/60°              |
| Stall Torque                | -                                                                              | 55.0kgf·cm (763.81oz-in) | 55.0kgf·cm (763.81oz-in) |
| Peak Efficiency Torque      | -                                                                              | 11.0kgf·cm (152.76oz-in) | 11.0kgf·cm (152.76oz-in) |
| Standing Current            | -                                                                              | 35mA                     | 35mA                     |
| No Load Running Current     | -                                                                              | 500mA                    | 500mA                    |
| Stall Current               | -                                                                              | 8,000mA                  | 6,500mA                  |
| Deadband                    | -                                                                              | 1μs                      | 1μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 320° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch)                   |                          |                          |
| Weight                      | 90.0g (3.175oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Aluminum Alloy                                                                 |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                                         |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP67                                                                           |                          |                          |
| Servo Amplifier Type        | 16bit programmable Digital                                                     |                          |                          |



MDB89MH

# 1-03276

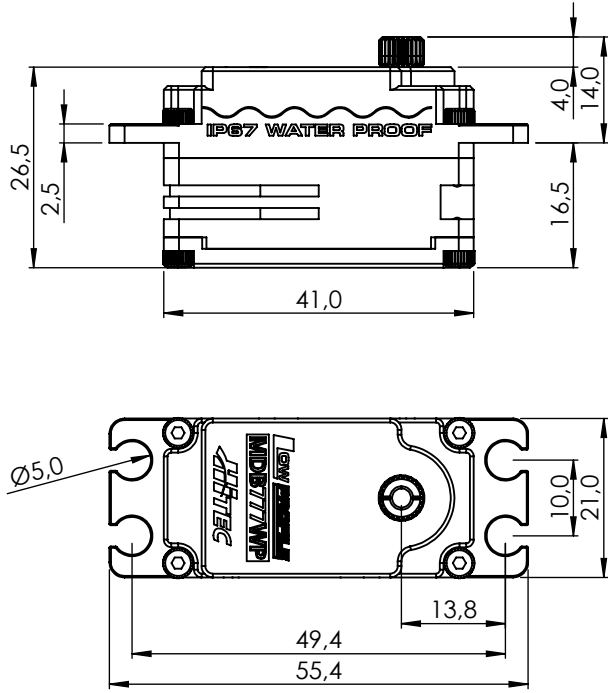


GENERAL SPECIFICATION

| MDB89MH                     |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                          |                          |
| Motor Type                  | BLDC                                                                           |                          |                          |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.17sec/60°              | 0.13sec/60°              |
| Stall Torque                | -                                                                              | 10.5kgf·cm (145.82oz·in) | 12.5kgf·cm (173.59oz·in) |
| Peak Efficiency Torque      | -                                                                              | 2.1kgf·cm (29.16oz·in)   | 2.5kgf·cm (34.72oz·in)   |
| Standing Current            | -                                                                              | 30mA                     | 30mA                     |
| No Load Running Current     | -                                                                              | 150mA                    | 170mA                    |
| Stall Current               | -                                                                              | 2,400mA                  | 3,000mA                  |
| Deadband                    | -                                                                              | 2μs                      | 2μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 175° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 240mm (9.449inch)                                                              |                          |                          |
| Connector Wire Gauge        | 22AWG                                                                          |                          |                          |
| Dimensions                  | 29.0mm x 13.0mm x 34.0mm (1.142inch x 0.512inch x 1.339inch)                   |                          |                          |
| Weight                      | 33.6g (1.185oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering Plastic                                                            |                          |                          |
| Gear Material               | 5 Metal Gears                                                                  |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP4X                                                                           |                          |                          |
| Servo Amplifier Type        | 32bit Programmable Digital                                                     |                          |                          |

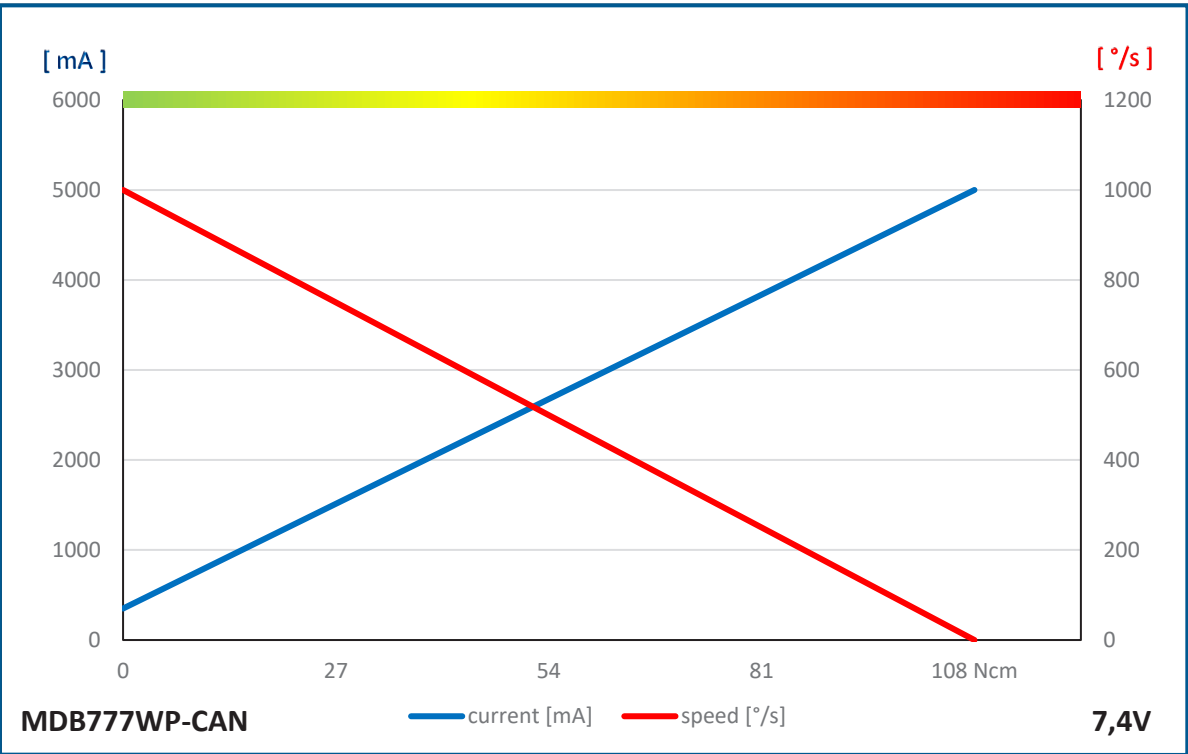
MDB-777WP-CAN/DRONECAN

#1-03030 #1-03031



1:1

PERFORMANCE CHART

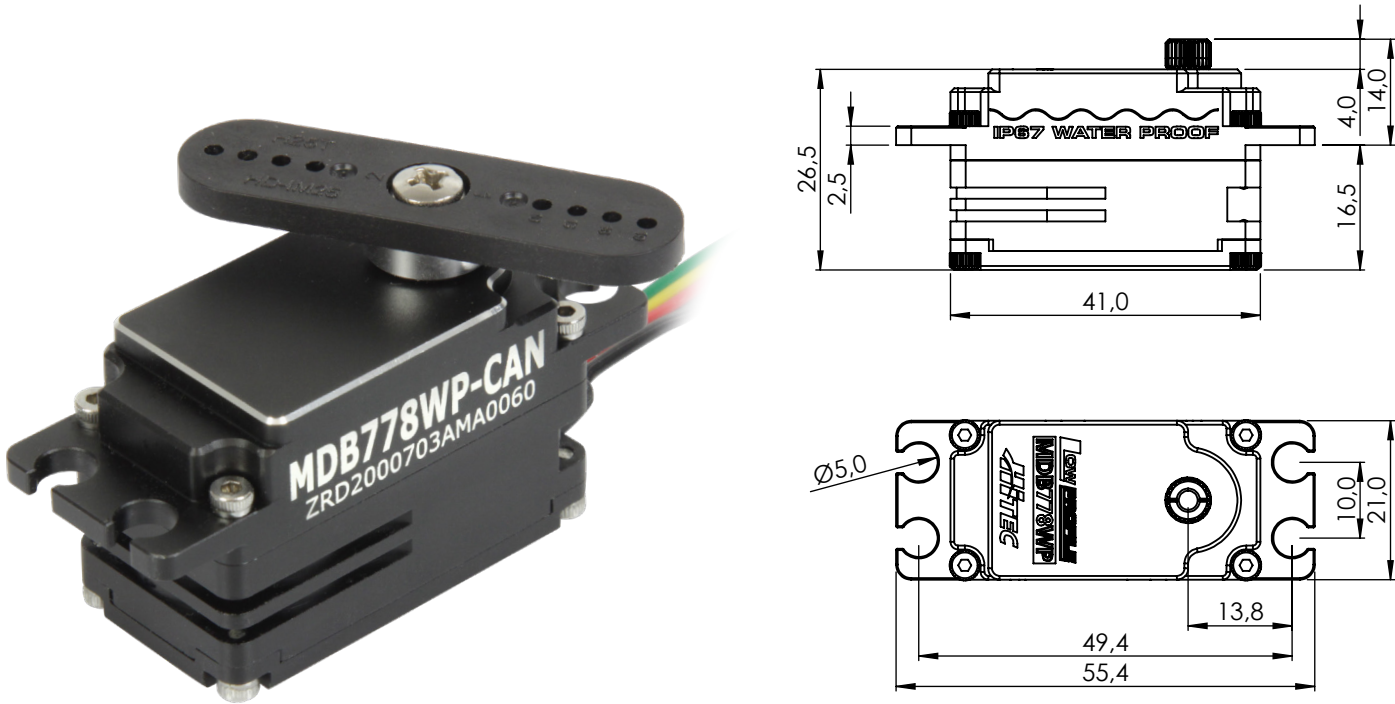


GENERAL SPECIFICATION

| MDB777WP-CAN/DroneCAN                        |                                                                    |                     |               |               |          |
|----------------------------------------------|--------------------------------------------------------------------|---------------------|---------------|---------------|----------|
| Control System                               | CAN BUS                                                            |                     |               |               |          |
|                                              | Protocol (Mode)                                                    | Standard 2.0A       |               | Extended 2.0B | DroneCAN |
|                                              | Baud-Rate                                                          | 10kbps ~ 1Mbps      |               |               |          |
|                                              | Sample-Point                                                       | 50% or 87.5%        |               |               |          |
|                                              | Available SERVO ID                                                 | 1 ~ 254             |               |               | 1 ~ 127  |
|                                              | Available Node ID                                                  | 1 ~ 2047            | 1 ~ 536870911 |               | 1 ~ 127  |
|                                              | Input Signal Range                                                 | 0 ~ 5V              |               |               |          |
| Connector Type                               | Hitec 4P                                                           |                     |               |               |          |
| Position Sensor Type                         | Contactless Magnetic Encoder                                       |                     |               |               |          |
| Motor Type                                   | BLDC                                                               |                     |               |               |          |
| Amplifier / MCU                              | 32bit programmable Digital                                         |                     |               |               |          |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                                        |                     |               |               |          |
| Operating Voltage                            | At 6.0V                                                            | At 7.4V             |               |               |          |
| Operating Speed at no Load                   | 750°/s (125RPM)                                                    | 1000°/s (167RPM)    |               |               |          |
| Stall Torque                                 | 8.0kgcm (78.5Ncm)                                                  | 11.0kgcm (107.9Ncm) |               |               |          |
| Peak Efficiency Torque                       | 1.6kgcm (15.7Ncm)                                                  | 2.2kgcm (21.6Ncm)   |               |               |          |
| Rest Current                                 | 26mA                                                               | 26mA                |               |               |          |
| Running Current at no Load                   | 320mA                                                              | 350mA               |               |               |          |
| Stall Current                                | 4000mA                                                             | 5000mA              |               |               |          |
| Deadband Width                               | n/a                                                                | n/a                 |               |               |          |
| Travel                                       | Travel / Command                                                   | 90° / 4096          |               |               |          |
|                                              | Servo mode                                                         | Left                | Center        | Right         |          |
|                                              | Pos Command                                                        | +1366               | +8192         | +15018        |          |
|                                              | Pos [°]                                                            | -150                | 0             | +150          |          |
|                                              | Turn Mode                                                          | Left                | Power On      | Right         |          |
|                                              | Pos Command                                                        | -16383              | 0             | +16383        |          |
|                                              | Pos [°]                                                            | -359                | 0             | +359          |          |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                                         |                     |               |               |          |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |               |               |          |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                                     |                     |               |               |          |
| Vibrations at no Load                        | -                                                                  |                     |               |               |          |
| Connector Wire Length                        | 300mm                                                              |                     |               |               |          |
| Connector Wire Gauge                         | 20AWG                                                              |                     |               |               |          |
| Connector Wire Strand Count                  | 80/0.08                                                            |                     |               |               |          |
| External Dimensions                          | 41.0 x 21.0 x 26.5mm                                               |                     |               |               |          |
| Weight*                                      | 70.0g                                                              |                     |               |               |          |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                     |               |               |          |
| Case Material                                | Aluminum Alloy                                                     |                     |               |               |          |
| Gear Material                                | 5 Hardened Steel Gears                                             |                     |               |               |          |
| Gear Train Backlash                          | Max. 0.5°                                                          |                     |               |               |          |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                     |               |               |          |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |               |               |          |
| IP-Rating                                    | IP67                                                               |                     |               |               |          |
| Revision                                     | Rev. 1.0 / 09.01.2024                                              |                     |               |               |          |
| Changelog                                    | -                                                                  |                     |               |               |          |
|                                              |                                                                    |                     |               |               |          |
| *of the servo only w/o horns and accessories |                                                                    |                     |               |               |          |

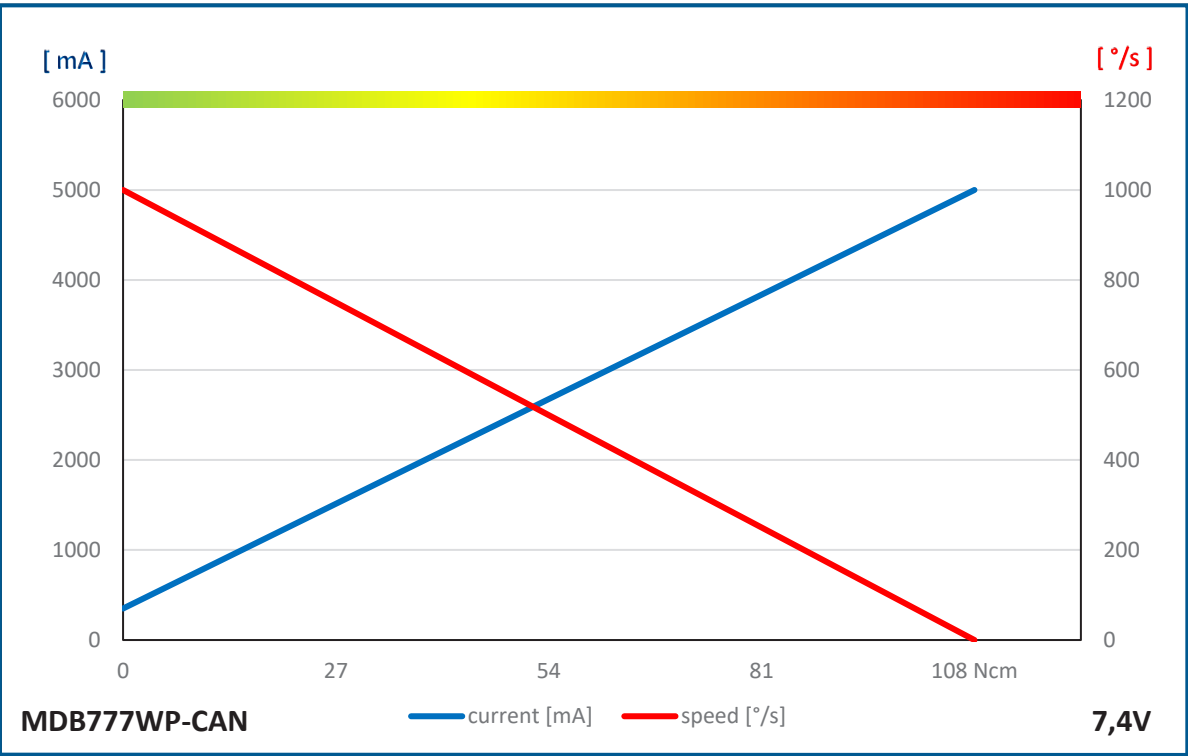
MDB778WP-CAN/DRONECAN

#1-03032 #1-03033



1:2

PERFORMANCE CHART

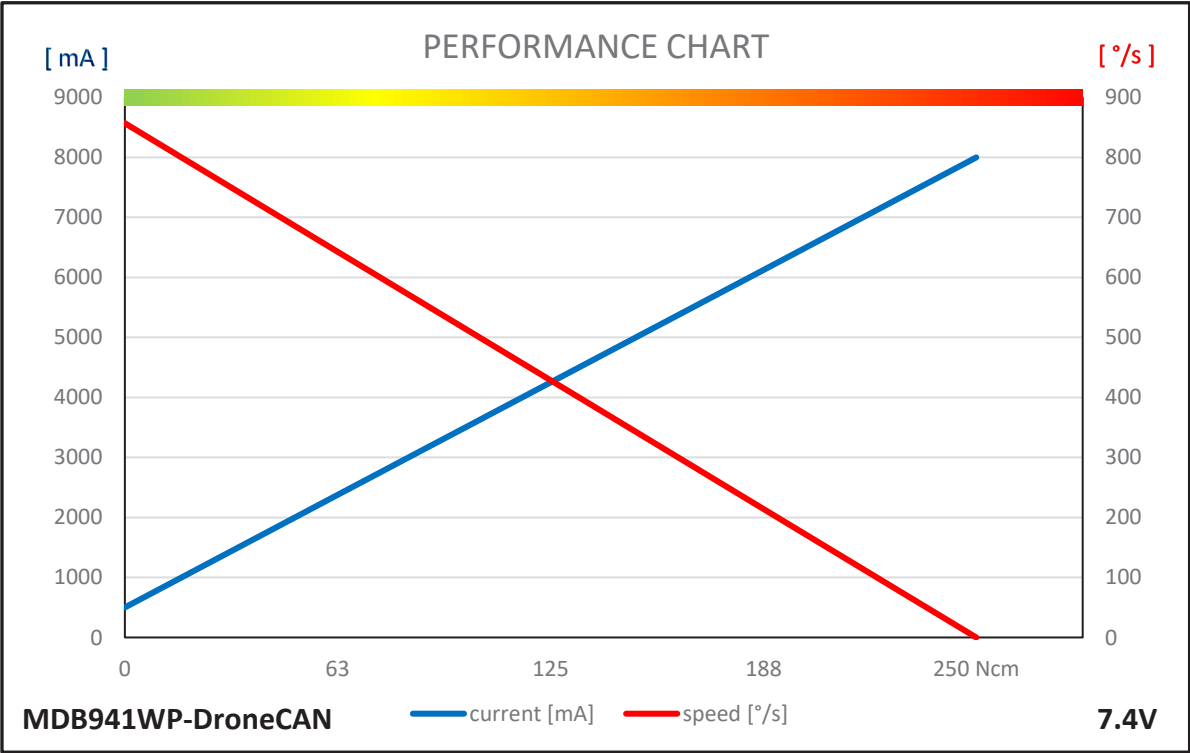
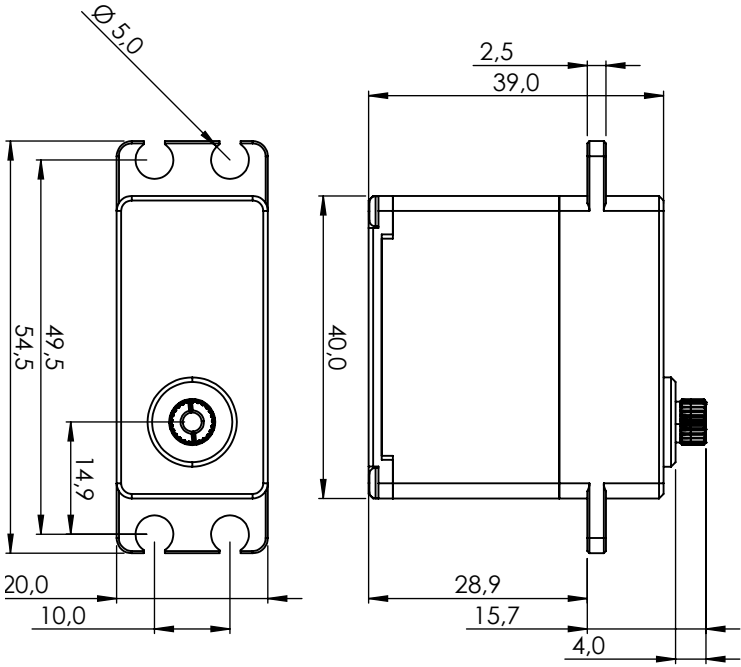


GENERAL SPECIFICATION

| MDB778WP-CAN/DroneCAN                        |                                                                    |                     |                     |               |
|----------------------------------------------|--------------------------------------------------------------------|---------------------|---------------------|---------------|
| Control System                               | CAN BUS                                                            |                     |                     |               |
|                                              | Protocol (Mode)                                                    | Standard 2.0A       |                     | Extended 2.0B |
|                                              | Baud-Rate                                                          | 10kbps ~ 1Mbps      |                     |               |
|                                              | Sample-Point                                                       | 50% or 87.5%        |                     |               |
|                                              | Available SERVO ID                                                 | 1 ~ 254             |                     | 1 ~ 127       |
|                                              | Available Node ID                                                  | 1 ~ 2047            | 1 ~ 536870911       | 1 ~ 127       |
| Connector Type                               | Hitec 4P                                                           |                     |                     |               |
|                                              | Contactless Magnetic Encoder                                       |                     |                     |               |
|                                              | BLDC                                                               |                     |                     |               |
|                                              | 32bit programmable Digital                                         |                     |                     |               |
|                                              | 4.0V ~ 8.4V                                                        |                     |                     |               |
|                                              | At 6.0V                                                            |                     |                     |               |
| Operating Voltage                            | At 7.4V                                                            |                     |                     |               |
|                                              | Operating Speed at no Load                                         | 462°/s (77RPM)      | 600°/s (100RPM)     |               |
|                                              | Stall Torque                                                       | 14.0kgcm (137.3Ncm) | 16.0kgcm (157.0Ncm) |               |
|                                              | Peak Efficiency Torque                                             | 2.8kgcm (27.5Ncm)   | 3.3kgcm (32.4Ncm)   |               |
|                                              | Rest Current                                                       | 50mA                | 50mA                |               |
|                                              | Running Current at no Load                                         | 400mA               | 500mA               |               |
| Deadband Width                               | 4000mA                                                             |                     |                     |               |
|                                              | 5000mA                                                             |                     |                     |               |
|                                              | n/a                                                                |                     |                     |               |
|                                              | n/a                                                                |                     |                     |               |
|                                              | Travel / Command                                                   |                     |                     |               |
|                                              | 90° / 4096                                                         |                     |                     |               |
| Travel                                       | Servo mode                                                         | Left                | Center              | Right         |
|                                              | Pos Command                                                        | +1366               | +8192               | +15018        |
|                                              | Pos [°]                                                            | -150                | 0                   | +150          |
|                                              | Turn Mode                                                          | Left                | Power On            | Right         |
|                                              | Pos Command                                                        | -16383              | 0                   | +16383        |
|                                              | Pos [°]                                                            | -359                | 0                   | +359          |
| Operating Temperature Range                  | Turn Range                                                         |                     |                     |               |
|                                              | -32760 ~ +32760 (CAN only)                                         |                     |                     |               |
|                                              | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |                     |               |
|                                              | Storage Temperature Range                                          |                     |                     |               |
|                                              | -30°C ~ +80°C (-31°F ~ +176°F)                                     |                     |                     |               |
|                                              | Vibrations at no Load                                              |                     |                     |               |
| Connector Wire Length                        | -                                                                  |                     |                     |               |
|                                              | 300mm                                                              |                     |                     |               |
|                                              | Connector Wire Gauge                                               |                     |                     |               |
|                                              | 20AWG                                                              |                     |                     |               |
|                                              | Connector Wire Strand Count                                        |                     |                     |               |
|                                              | 80/0.08                                                            |                     |                     |               |
| External Dimensions                          | 41.0 x 21.0 x 26.5mm                                               |                     |                     |               |
|                                              | Weight*                                                            |                     |                     |               |
|                                              | 70.0g                                                              |                     |                     |               |
|                                              | Ball Bearing                                                       |                     |                     |               |
|                                              | Dual Ball Bearing                                                  |                     |                     |               |
|                                              | Case Material                                                      |                     |                     |               |
| Gear Material                                | Aluminum Alloy                                                     |                     |                     |               |
|                                              | 5 Hardened Steel Gears                                             |                     |                     |               |
|                                              | Gear Train Backlash                                                |                     |                     |               |
|                                              | Max. 0.5°                                                          |                     |                     |               |
|                                              | Horn Gear Spline                                                   |                     |                     |               |
|                                              | H25T Ø6.0                                                          |                     |                     |               |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |                     |               |
|                                              | IP-Rating                                                          |                     |                     |               |
|                                              | IP67                                                               |                     |                     |               |
|                                              | Revision                                                           |                     |                     |               |
|                                              | Rev. 1.0 / 09.01.2024                                              |                     |                     |               |
|                                              | Changelog                                                          |                     |                     |               |
| *of the servo only w/o horns and accessories | -                                                                  |                     |                     |               |
|                                              |                                                                    |                     |                     |               |
|                                              |                                                                    |                     |                     |               |
|                                              |                                                                    |                     |                     |               |
|                                              |                                                                    |                     |                     |               |
|                                              |                                                                    |                     |                     |               |

MDB941WP-DRONECAN

# 1-03314



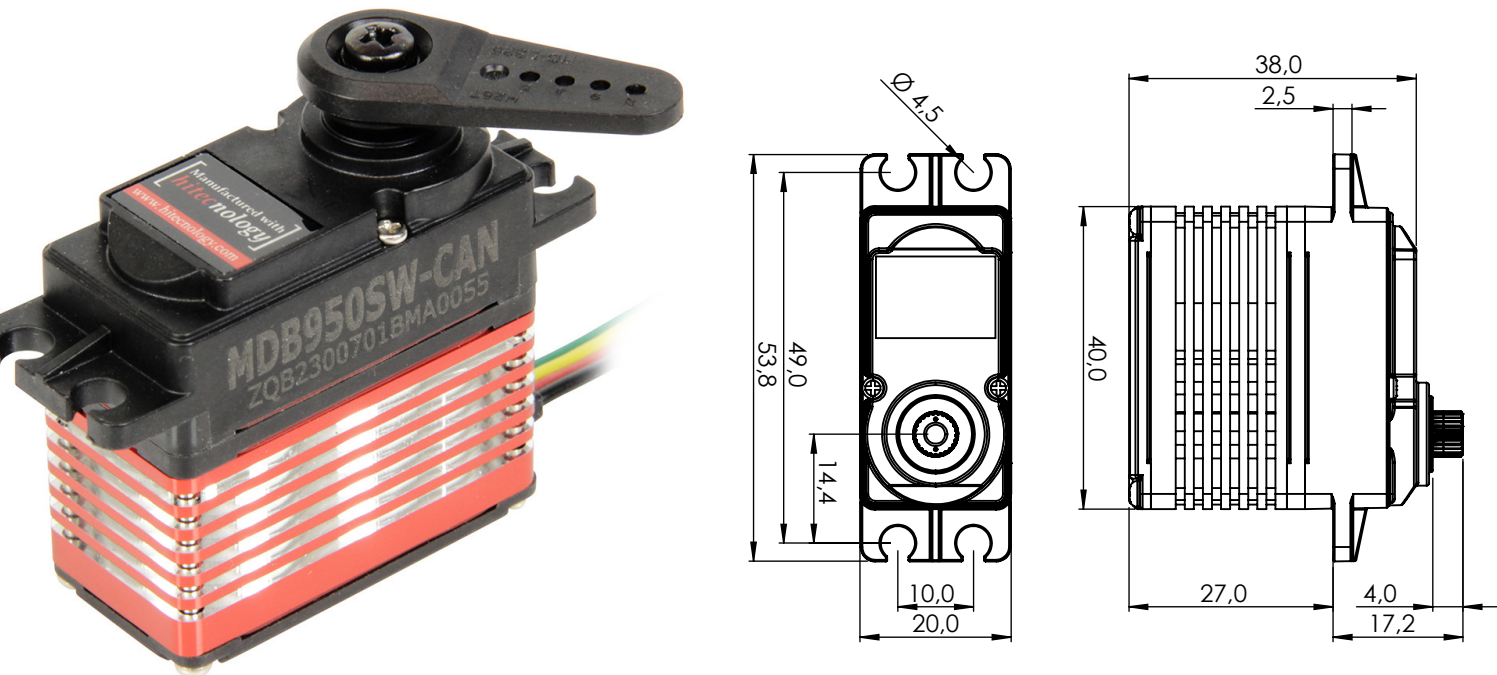
GENERAL SPECIFICATION

| MDB941WP-DroneCAN           |                                                              |                          |                          |
|-----------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | DroneCAN (UAVCAN v0)                                         |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                 |                          |                          |
| Motor Type                  | BLDC                                                         |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                   |                          |                          |
| Voltage                     | -                                                            | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                            | 0.085sec/60°             | 0.07sec/60°              |
| Stall Torque                | -                                                            | 20.6kgf·cm (286.08oz·in) | 25.4kgf·cm (352.74oz·in) |
| Peak Efficiency Torque      | -                                                            | 4.1kgf·cm (56.94oz·in)   | 5.1kgf·cm (70.83oz·in)   |
| Standing Current            | -                                                            | 30mA                     | 30mA                     |
| No Load Running Current     | -                                                            | 500mA                    | 500mA                    |
| Stall Current               | -                                                            | 8,000mA                  | 8,000mA                  |
| Deadband                    | -                                                            | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable)              |                          |                          |
| Continuous Rotation         | n/a                                                          |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                 |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                            |                          |                          |
| Connector Wire Gauge        | 20AWG                                                        |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch) |                          |                          |
| Weight                      | 91.7g (3.235oz)                                              |                          |                          |
| Bearing Type                | 2 Ball Bearing                                               |                          |                          |
| Case Material               | Aluminum Alloy                                               |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                       |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                     |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                      |                          |                          |
| IP-Rating                   | IP67                                                         |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                   |                          |                          |



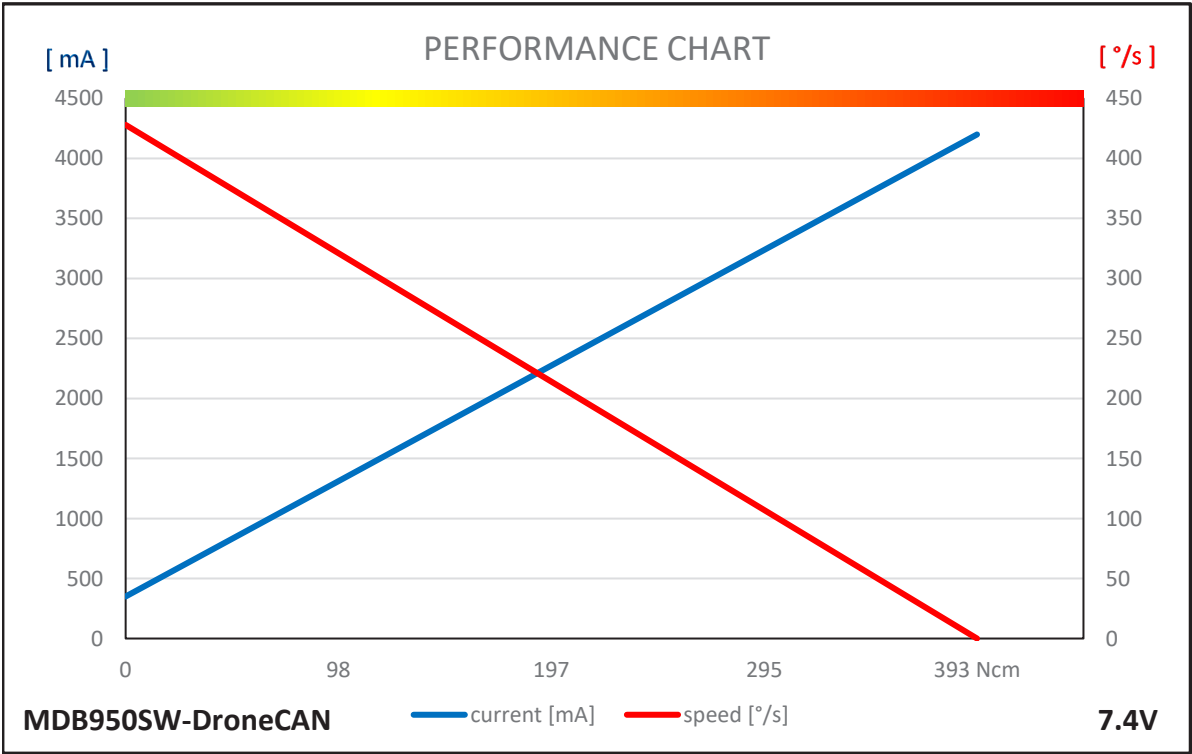
MDB950SW-DRONECAN

# 1-03313



GENERAL SPECIFICATION

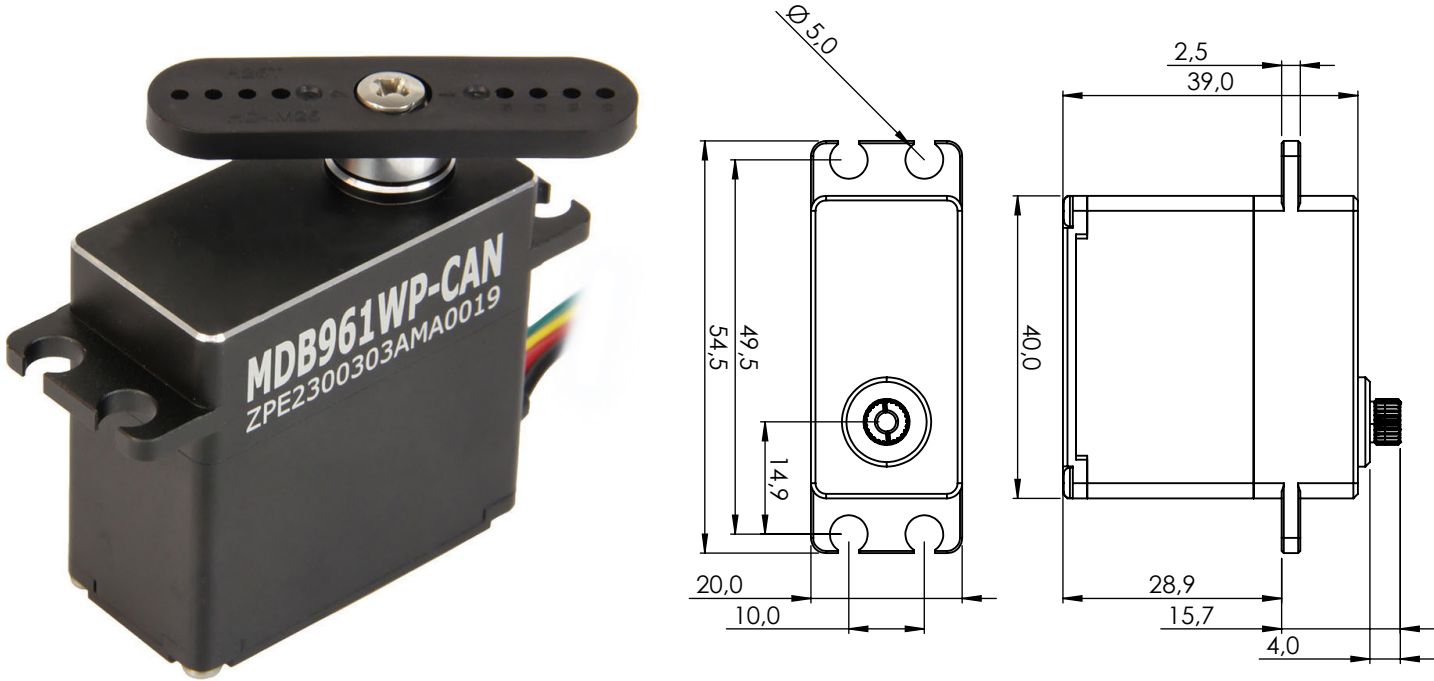
| MDB950SW-DroneCAN           |                                                              |                          |                          |
|-----------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | DroneCAN (UAVCAN v0)                                         |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                 |                          |                          |
| Motor Type                  | BLDC                                                         |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                   |                          |                          |
| Voltage                     | 4.8V                                                         | 6.0V                     | 7.4V                     |
| No Load Speed               | 0.23sec/60°                                                  | 0.18sec/60°              | 0.14sec/60°              |
| Stall Torque                | 35.0kgf·cm (486.06oz·in)                                     | 40.0kgf·cm (555.5 oz·in) | 40.0kgf·cm (555.5 oz·in) |
| Peak Efficiency Torque      | 7.0kgf·cm (97.21oz·in)                                       | 8.0kgf·cm (111.1 oz·in)  | 8.0kgf·cm (111.1 oz·in)  |
| Standing Current            | 30mA                                                         | 30mA                     | 30mA                     |
| No Load Running Current     | 350mA                                                        | 350mA                    | 350mA                    |
| Stall Current               | 5,000mA                                                      | 5,000mA                  | 4,200mA                  |
| Deadband                    | n/a                                                          | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable)              |                          |                          |
| Continuous Rotation         | n/a                                                          |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                 |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                            |                          |                          |
| Connector Wire Gauge        | 20AWG                                                        |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 38.5mm (1.575inch x 0.787inch x 1.516inch) |                          |                          |
| Weight                      | 70.7g (2.494oz)                                              |                          |                          |
| Bearing Type                | 2 Ball Bearing                                               |                          |                          |
| Case Material               | Engineering Plastic & Aluminum Heat Sink                     |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Hardened Steel Gears                     |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                     |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                      |                          |                          |
| IP-Rating                   | IP54                                                         |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                   |                          |                          |





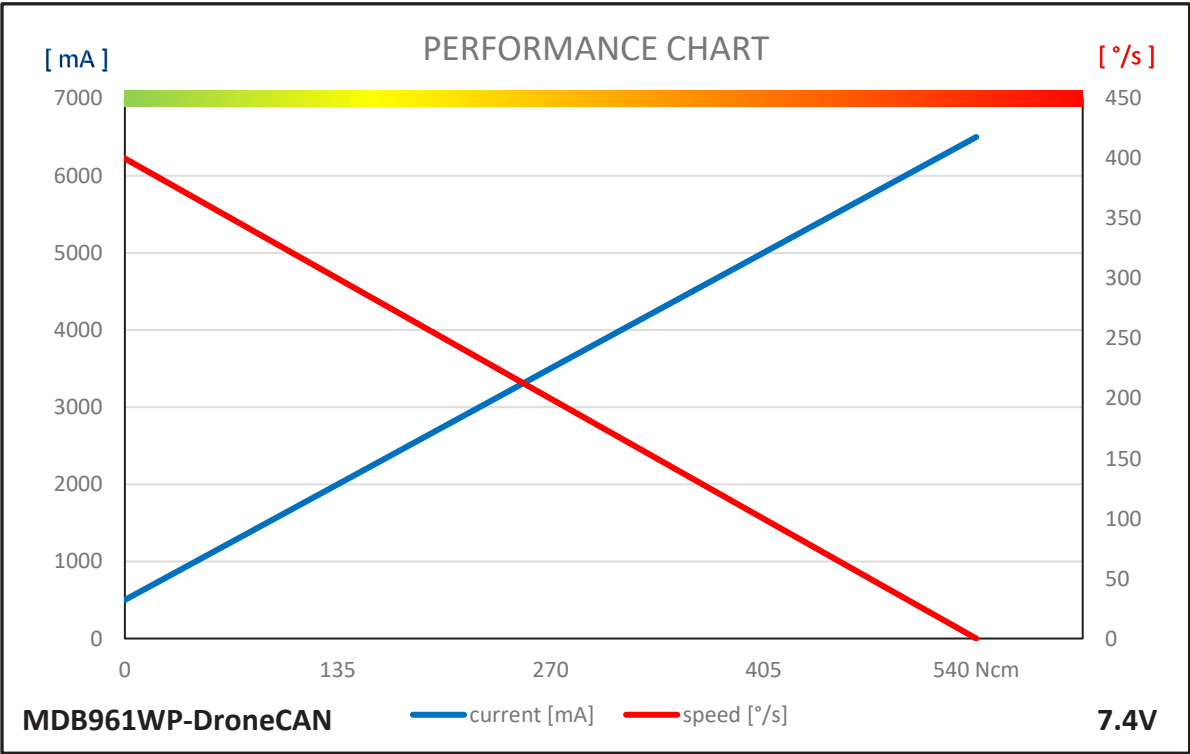
# MDB961WP-UAVCAN / DRONECAN

# 1-03228



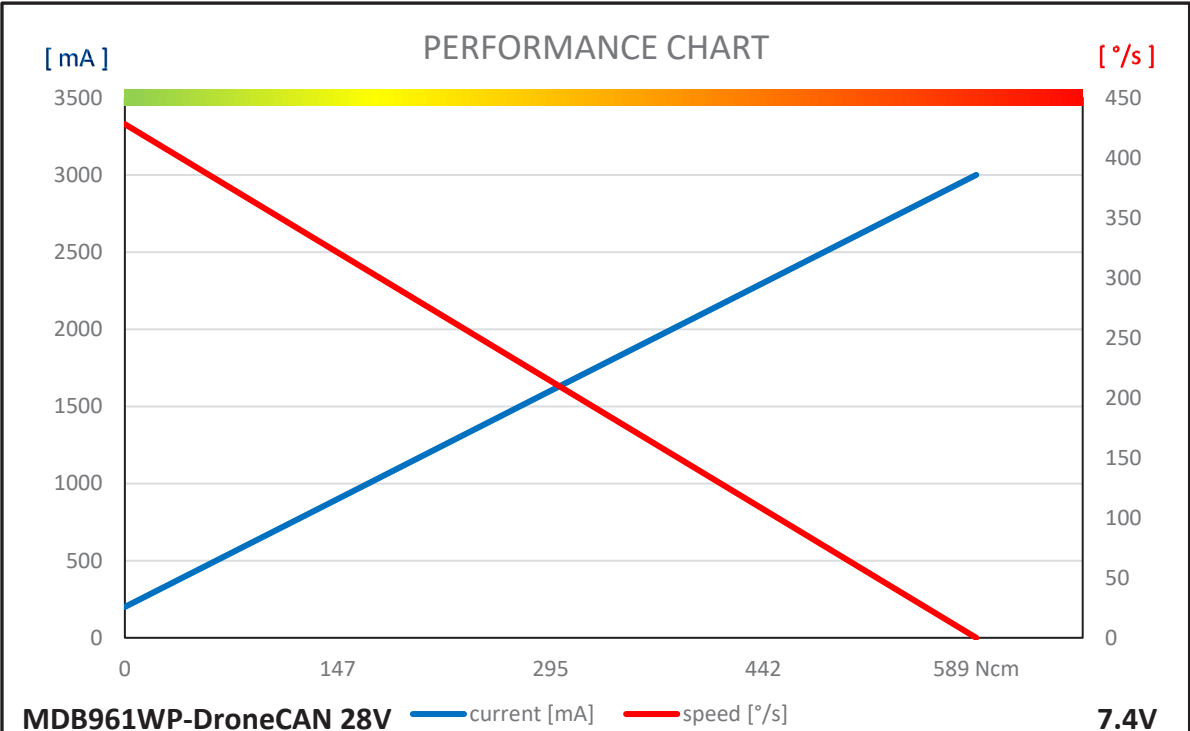
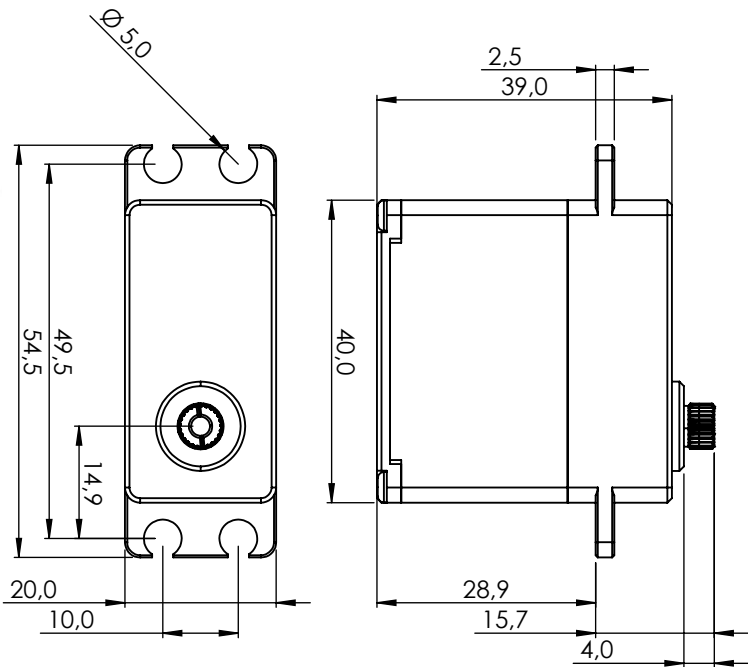
## GENERAL SPECIFICATION

| MDB961WP-UAVCAN / DroneCAN  |                                                              |                          |                          |
|-----------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | DroneCAN (UAVCAN v0)                                         |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                 |                          |                          |
| Motor Type                  | BLDC                                                         |                          |                          |
| Operating Voltage Range     | 4.0 ~ 8.4V                                                   |                          |                          |
| Voltage                     | -                                                            | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                            | 0.18sec/60°              | 0.15sec/60°              |
| Stall Torque                | -                                                            | 55.0kgf·cm (763.81oz·in) | 55.0kgf·cm (763.81oz·in) |
| Peak Efficiency Torque      | -                                                            | 11.0kgf·cm (152.76oz·in) | 11.0kgf·cm (152.76oz·in) |
| Standing Current            | -                                                            | 30mA                     | 30mA                     |
| No Load Running Current     | -                                                            | 500mA                    | 500mA                    |
| Stall Current               | -                                                            | 8,000mA                  | 6,500mA                  |
| Deadband                    | -                                                            | n/a                      | n/a                      |
| Operating Travel            | Servo Mode : ±60°(Default), ±150°(Programmable)              |                          |                          |
| Continuous Rotation         | n/a                                                          |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                 |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                            |                          |                          |
| Connector Wire Gauge        | 20AWG                                                        |                          |                          |
| Dimensions                  | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch) |                          |                          |
| Weight                      | 90.0g (3.175oz)                                              |                          |                          |
| Bearing Type                | 2 Ball Bearing                                               |                          |                          |
| Case Material               | Aluminum Alloy                                               |                          |                          |
| Gear Material               | 5 Hardened Steel Gears                                       |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                     |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                      |                          |                          |
| IP-Rating                   | IP67                                                         |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                   |                          |                          |



MDB961WP-UAVCAN/DRONECAN-28V

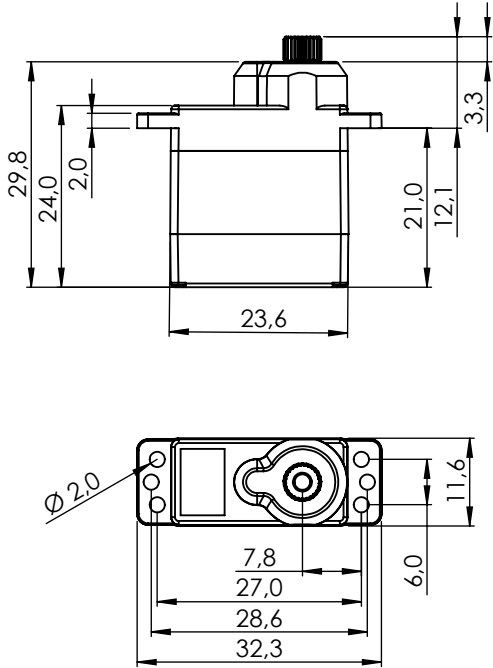
# 1-03229



GENERAL SPECIFICATION

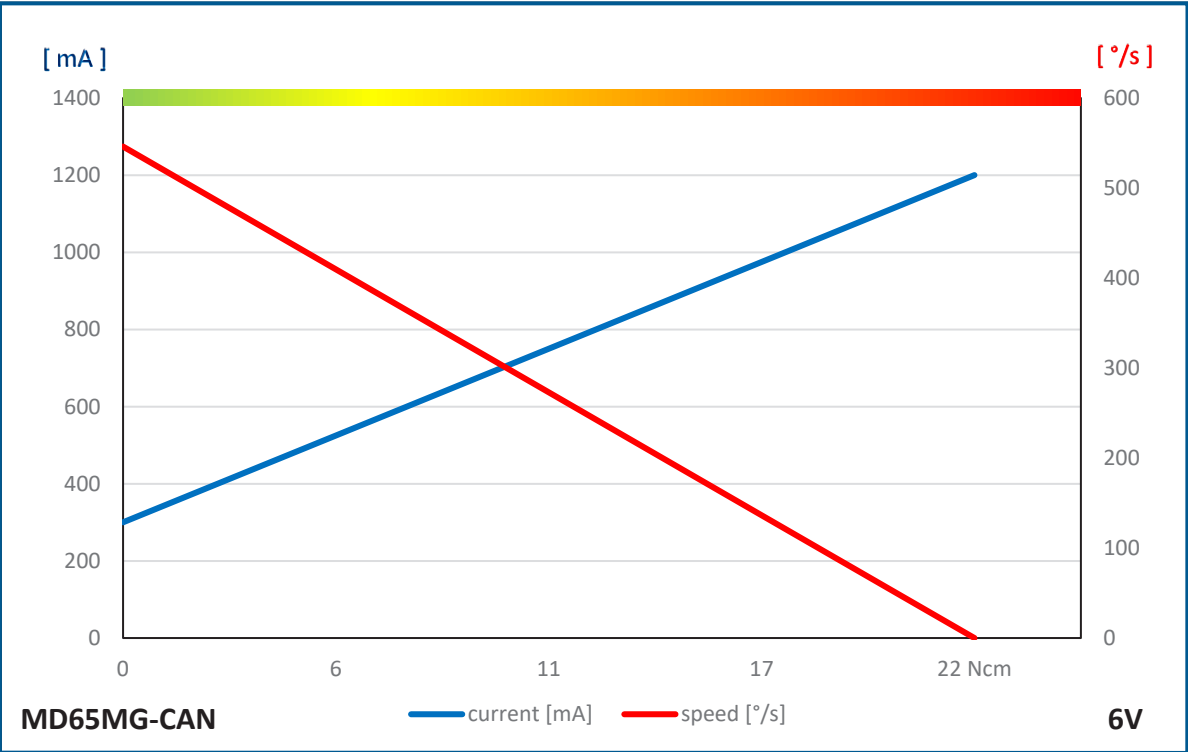
| MDB961WP-UAVCAN/DroneCAN-28V |                                                              |                          |                          |
|------------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Control System               | DroneCAN (UAVCAN v0)                                         |                          |                          |
| Position Sensor Type         | Contactless Magnetic Encoder                                 |                          |                          |
| Motor Type                   | BLDC                                                         |                          |                          |
| Operating Voltage Range      | 8.0 ~ 32.0V                                                  |                          |                          |
| Voltage                      | 12.0V                                                        | 24.0V                    | 28.0V                    |
| No Load Speed                | 0.14sec/60°                                                  | 0.14sec/60°              | 0.14sec/60°              |
| Stall Torque                 | 60.0kgf·cm (833.24oz·in)                                     | 60.0kgf·cm (833.24oz·in) | 60.0kgf·cm (833.24oz·in) |
| Peak Efficiency Torque       | 12.0kgf·cm (166.65oz·in)                                     | 12.0kgf·cm (166.65oz·in) | 12.0kgf·cm (166.65oz·in) |
| Standing Current             | 20mA                                                         | 12mA                     | 11mA                     |
| No Load Running Current      | 500mA                                                        | 300mA                    | 200mA                    |
| Stall Current                | 6,700mA                                                      | 3,400mA                  | 3,000mA                  |
| Deadband                     | n/a                                                          | n/a                      | n/a                      |
| Operating Travel             | Servo Mode : ±60°(Default), ±150°(Programmable)              |                          |                          |
| Continuous Rotation          | n/a                                                          |                          |                          |
| Operating Temperature Range  | -20°C ~ +60°C (-4°F ~+140°F)                                 |                          |                          |
| Storage Temperature Range    | -30°C ~ +80°C (-22°F ~+176°F)                                |                          |                          |
| Connector Wire Length        | 300mm (11.81inch)                                            |                          |                          |
| Connector Wire Gauge         | 20AWG                                                        |                          |                          |
| Dimensions                   | 40.0mm x 20.0mm x 39.0mm (1.575inch x 0.787inch x 1.535inch) |                          |                          |
| Weight                       | 90.0g (3.175oz)                                              |                          |                          |
| Bearing Type                 | 2 Ball Bearing                                               |                          |                          |
| Case Material                | Aluminum Alloy                                               |                          |                          |
| Gear Material                | 5 Hardened Steel Gears                                       |                          |                          |
| Gear Train Backlash          | Max 0.5°                                                     |                          |                          |
| Horn Gear Spline             | 25T(Ø6)                                                      |                          |                          |
| IP-Rating                    | IP67                                                         |                          |                          |
| Servo Amplifier Type         | 32bit programmable Digital                                   |                          |                          |

MD65MG-CAN/UAV/DRONECAN



1:1

PERFORMANCE CHART

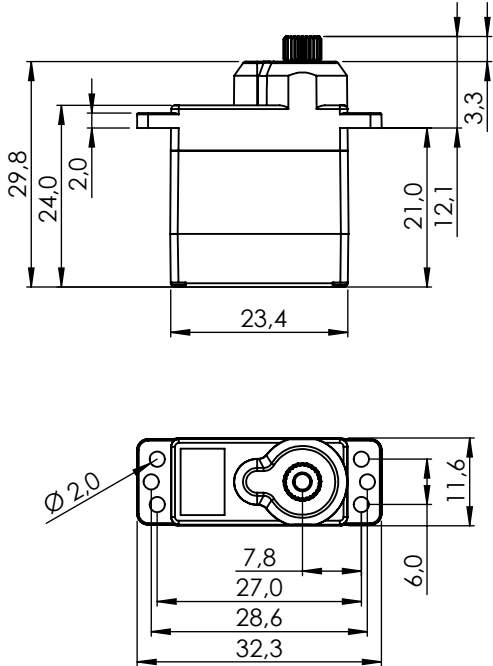


GENERAL SPECIFICATION

| MD65MG-CAN/UAVCAN/DroneCAN                   |                                                     |                |                   |               |                 |
|----------------------------------------------|-----------------------------------------------------|----------------|-------------------|---------------|-----------------|
| Control System                               | CAN BUS                                             |                |                   |               |                 |
|                                              | Protocol (Mode)                                     | Standard 2.0A  |                   | Extended 2.0B | UAVCAN/DroneCAN |
|                                              | Baud-Rate                                           | 10kbps ~ 1Mbps |                   |               |                 |
|                                              | Sample-Point                                        | 50% or 87.5%   |                   |               |                 |
|                                              | Available SERVO ID                                  | 1 ~ 254        |                   |               | 1 ~ 127         |
|                                              | Available Node ID                                   | 1 ~ 2047       |                   | 1 ~ 536870911 | 1 ~ 127         |
|                                              | Input Signal Range                                  | 0 ~ 5V         |                   |               |                 |
| Connector Type                               | Hitec 4P                                            |                |                   |               |                 |
| Position Sensor Type                         | Contactless Magnetic Encoder                        |                |                   |               |                 |
| Motor Type                                   | Cored Metal Brush                                   |                |                   |               |                 |
| Amplifier / MCU                              | 32bit programmable Digital                          |                |                   |               |                 |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                         |                |                   |               |                 |
| Operating Voltage                            | At 4.8V                                             |                | At 6.0V           |               |                 |
| Operating Speed at no Load                   | 429°/s (71RPM)                                      |                | 546°/s (91RPM)    |               |                 |
| Stall Torque                                 | 1.8kgcm (17.7Ncm)                                   |                | 2.2kgcm (21.6Ncm) |               |                 |
| Peak Efficiency Torque                       | 0.4kgcm (3.9Ncm)                                    |                | 0.4kgcm (3.9Ncm)  |               |                 |
| Rest Current                                 | 30mA                                                |                | 30mA              |               |                 |
| Running Current at no Load                   | 180mA                                               |                | 220mA             |               |                 |
| Stall Current                                | 960mA                                               |                | 1200mA            |               |                 |
| Deadband Width                               | 4Step                                               |                | 4Step             |               |                 |
| Travel                                       | Travel / Command                                    | 90° / 4096     |                   |               |                 |
|                                              | Servo mode                                          | Left           | Center            | Right         |                 |
|                                              | Pos Command                                         | +1366          | +8192             | +15018        |                 |
|                                              | Pos [°]                                             | -150           | 0                 | +150          |                 |
|                                              | Turn Mode                                           | Left           | Power On          | Right         |                 |
|                                              | Pos Command                                         | -16383         | 0                 | +16383        |                 |
|                                              | Pos [°]                                             | -359           | 0                 | +359          |                 |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                          |                |                   |               |                 |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                       |                |                   |               |                 |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                      |                |                   |               |                 |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII                             |                |                   |               |                 |
| Connector Wire Length                        | 300mm                                               |                |                   |               |                 |
| Connector Wire Gauge                         | 28AWG                                               |                |                   |               |                 |
| Connector Wire Strand Count                  | 20/0.08                                             |                |                   |               |                 |
| External Dimensions                          | 23.6 x 11.6 x 24.0mm                                |                |                   |               |                 |
| Weight*                                      | 12.8g                                               |                |                   |               |                 |
| Ball Bearing                                 | Single Ball Bearing                                 |                |                   |               |                 |
| Case Material                                | Engineering Plastic                                 |                |                   |               |                 |
| Gear Material                                | 1 Heavy Duty Resin & 4 Metal Gears                  |                |                   |               |                 |
| Gear Train Backlash                          | Max. 0.5°                                           |                |                   |               |                 |
| Horn Gear Spline                             | 25T Ø5.0                                            |                |                   |               |                 |
| Accessories                                  | Tapping Screw, Servo Horns (MS-I25, MS-L25, MS-X25) |                |                   |               |                 |
| IP-Rating                                    | IP4X                                                |                |                   |               |                 |
| Revision                                     | Rev. 1.1 / 03.01.2024                               |                |                   |               |                 |
| Changelog                                    | -                                                   |                |                   |               |                 |
|                                              |                                                     |                |                   |               |                 |
| *of the servo only w/o horns and accessories |                                                     |                |                   |               |                 |

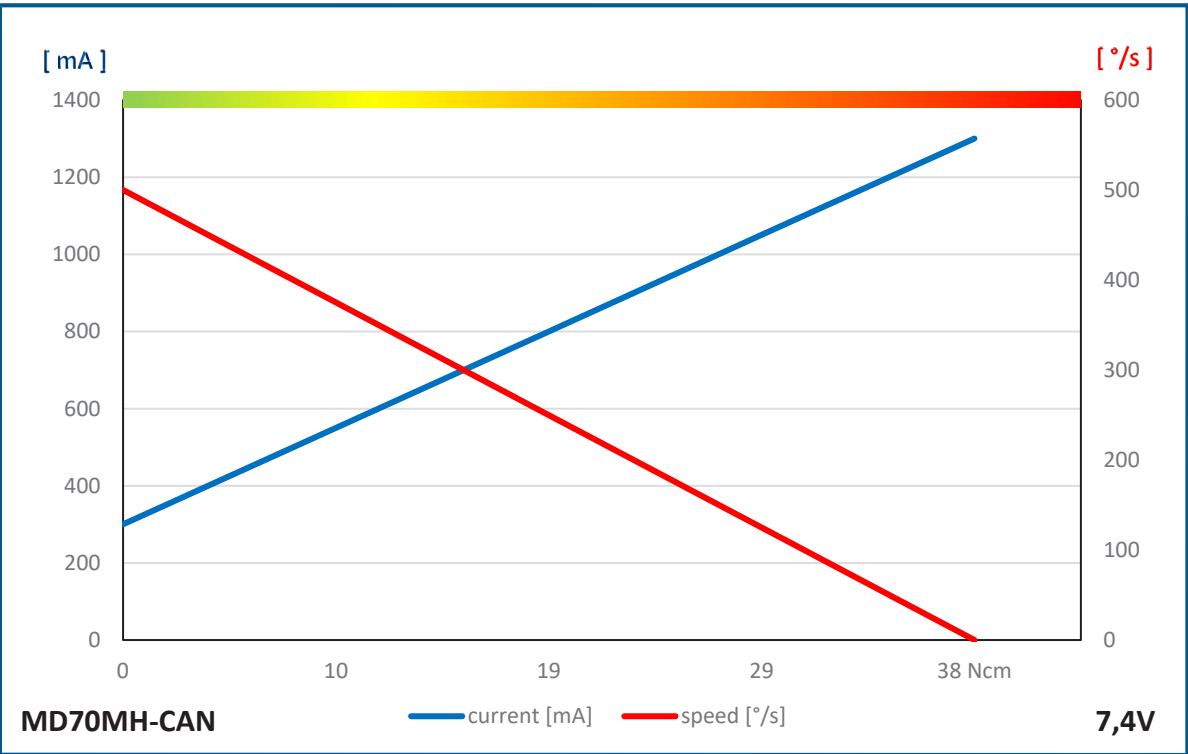
MD70MH-CAN/UAVCAN/DRONECAN

#1-01201,#1-01644



1:1

PERFORMANCE CHART

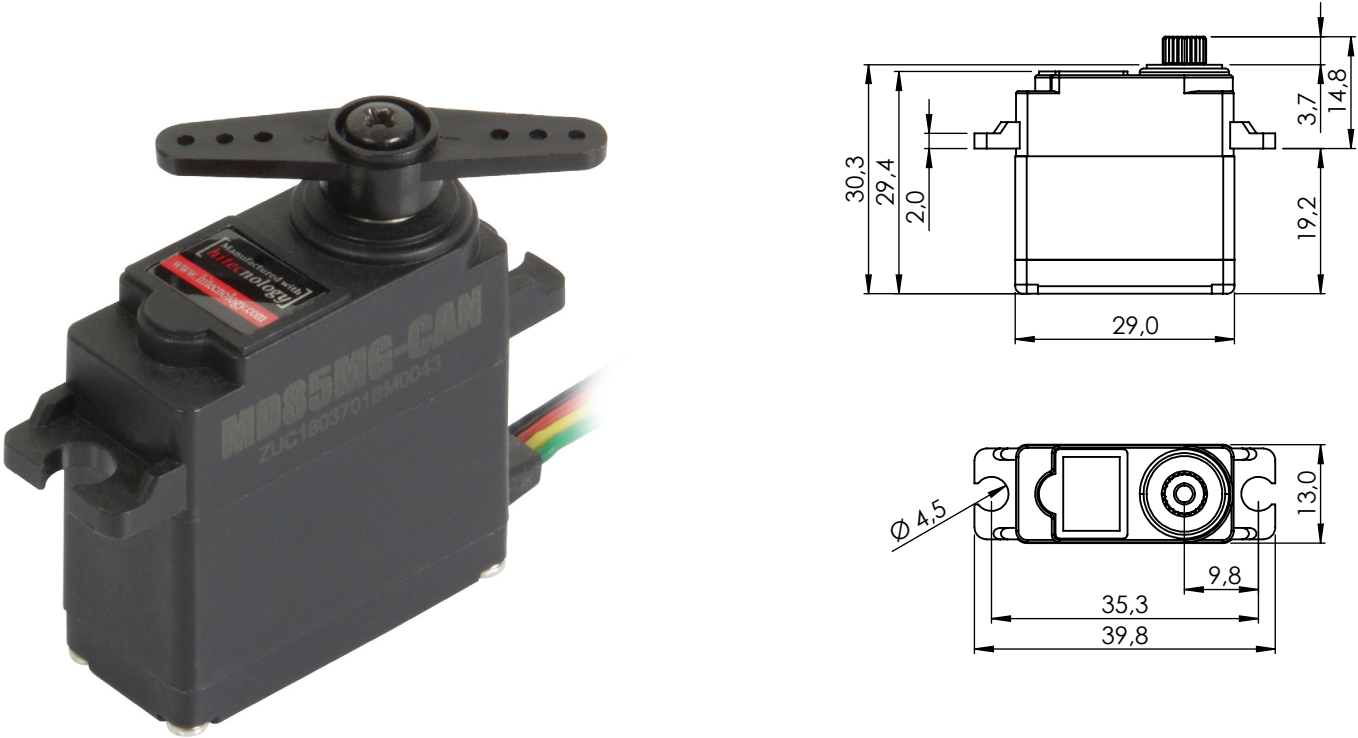


GENERAL SPECIFICATION

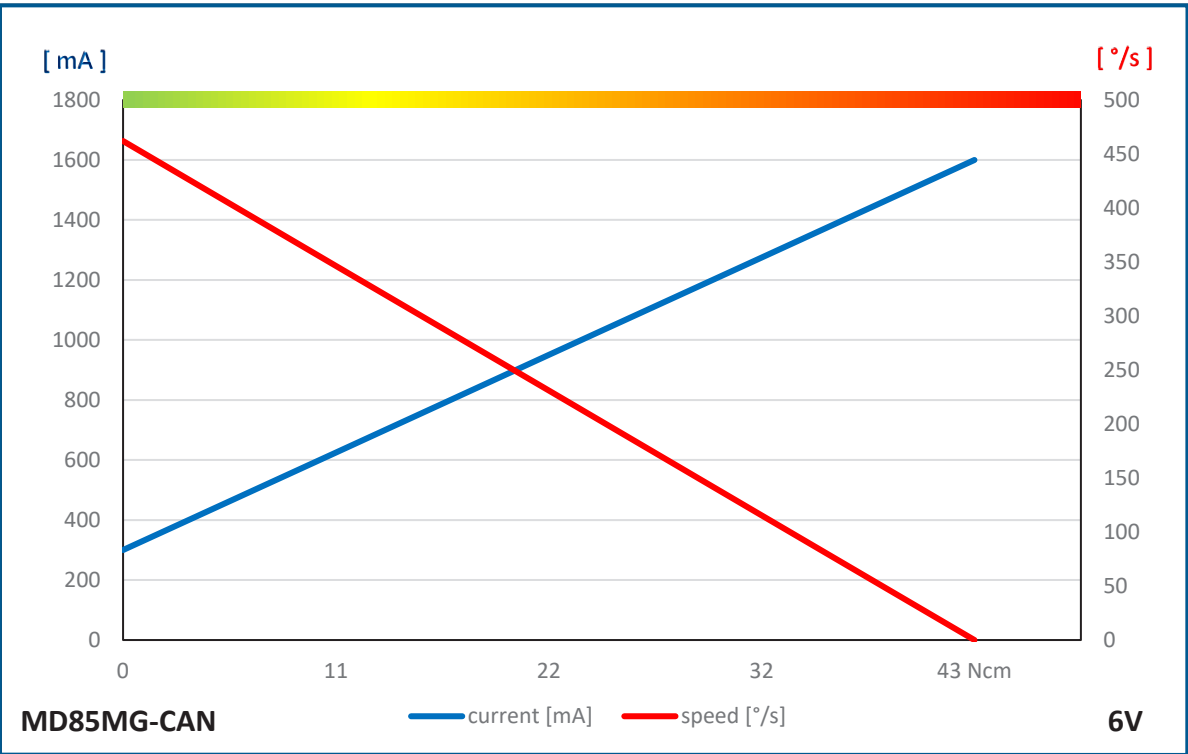
| MD70MH-CAN/UAVCAN/DroneCAN                   |                                                     |                   |               |               |                 |
|----------------------------------------------|-----------------------------------------------------|-------------------|---------------|---------------|-----------------|
| Control System                               | CAN BUS                                             |                   |               |               |                 |
|                                              | Protocol (Mode)                                     | Standard 2.0A     |               | Extended 2.0B | UAVCAN/DroneCAN |
|                                              | Baud-Rate                                           | 10kbps ~ 1Mbps    |               |               |                 |
|                                              | Sample-Point                                        | 50% or 87.5%      |               |               |                 |
|                                              | Available SERVO ID                                  | 1 ~ 254           |               |               | 1 ~ 127         |
|                                              | Available Node ID                                   | 1 ~ 2047          | 1 ~ 536870911 | 1 ~ 127       |                 |
|                                              | Input Signal Range                                  | 0 ~ 5V            |               |               |                 |
| Connector Type                               | Hitec 4P                                            |                   |               |               |                 |
| Position Sensor Type                         | Contactless Magnetic Encoder                        |                   |               |               |                 |
| Motor Type                                   | Cored Metal Brush                                   |                   |               |               |                 |
| Amplifier / MCU                              | 32bit programmable Digital                          |                   |               |               |                 |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                         |                   |               |               |                 |
| Operating Voltage                            | At 6.0V                                             | At 7.4V           |               |               |                 |
| Operating Speed at no Load                   | 400°/s (67RPM)                                      | 500°/s (83RPM)    |               |               |                 |
| Stall Torque                                 | 3.1kgcm (30.4Ncm)                                   | 3.8kgcm (37.3Ncm) |               |               |                 |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                                    | 0.8kgcm (7.9Ncm)  |               |               |                 |
| Rest Current                                 | 30mA                                                | 30mA              |               |               |                 |
| Running Current at no Load                   | 200mA                                               | 240mA             |               |               |                 |
| Stall Current                                | 1000mA                                              | 1300mA            |               |               |                 |
| Deadband Width                               | n/a                                                 | n/a               |               |               |                 |
| Travel                                       | Travel / Command                                    | 90° / 4096        |               |               |                 |
|                                              | Servo mode                                          | Left              | Center        | Right         |                 |
|                                              | Pos Command                                         | +1366             | +8192         | +15018        |                 |
|                                              | Pos [°]                                             | -150              | 0             | +150          |                 |
|                                              | Turn Mode                                           | Left              | Power On      | Right         |                 |
|                                              | Pos Command                                         | -16383            | 0             | +16383        |                 |
|                                              | Pos [°]                                             | -359              | 0             | +359          |                 |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                          |                   |               |               |                 |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                       |                   |               |               |                 |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                      |                   |               |               |                 |
| Vibrations at no Load                        | -                                                   |                   |               |               |                 |
| Connector Wire Length                        | 300mm                                               |                   |               |               |                 |
| Connector Wire Gauge                         | 28AWG                                               |                   |               |               |                 |
| Connector Wire Strand Count                  | 20/0.08                                             |                   |               |               |                 |
| External Dimensions                          | 23.4 x 11.4 x 24.0mm                                |                   |               |               |                 |
| Weight*                                      | 14.1g                                               |                   |               |               |                 |
| Ball Bearing                                 | Single Ball Bearing                                 |                   |               |               |                 |
| Case Material                                | Engineering Plastic                                 |                   |               |               |                 |
| Gear Material                                | 1 Heavy Duty Resin & 4 Metal Gears                  |                   |               |               |                 |
| Gear Train Backlash                          | Max. 0.5°                                           |                   |               |               |                 |
| Horn Gear Spline                             | 25T Ø5.0                                            |                   |               |               |                 |
| Accessories                                  | Tapping Screw, Servo Horns (MS-I25, MS-L25, MS-X25) |                   |               |               |                 |
| Dust & Water Protection class                | IP4X                                                |                   |               |               |                 |
| Revision                                     | Rev. 1.1 / 03.01.2024                               |                   |               |               |                 |
| Changelog                                    | -                                                   |                   |               |               |                 |
|                                              |                                                     |                   |               |               |                 |
| *of the servo only w/o horns and accessories |                                                     |                   |               |               |                 |



MD85MG-CAN/UAVCAN/DRONECAN



PERFORMANCE CHART



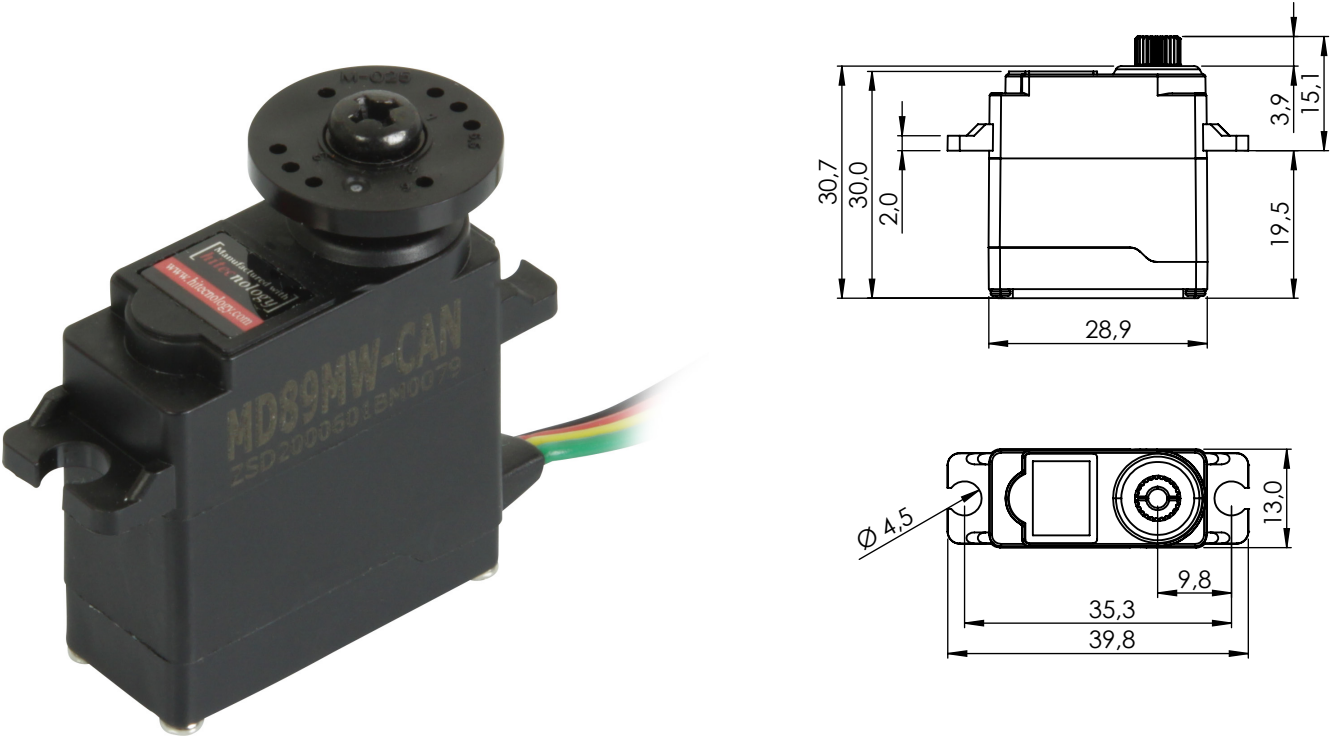
GENERAL SPECIFICATION

| MD85MG-CAN/UAVCAN/DroneCAN                   |                                                |                   |               |               |                 |
|----------------------------------------------|------------------------------------------------|-------------------|---------------|---------------|-----------------|
| Control System                               | CAN BUS                                        |                   |               |               |                 |
|                                              | Protocol (Mode)                                | Standard 2.0A     |               | Extended 2.0B | UAVCAN/DroneCAN |
|                                              | Baud-Rate                                      | 10kbps ~ 1Mbps    |               |               |                 |
|                                              | Sample-Point                                   | 50% or 87.5%      |               |               |                 |
|                                              | Available SERVO ID                             | 1 ~ 254           |               |               | 1 ~ 127         |
|                                              | Available Node ID                              | 1 ~ 2047          | 1 ~ 536870911 |               | 1 ~ 127         |
|                                              | Input Signal Range                             | 0 ~ 5V            |               |               |                 |
| Connector Type                               | Hitec 4P                                       |                   |               |               |                 |
| Position Sensor Type                         | Contactless Magnetic Encoder                   |                   |               |               |                 |
| Motor Type                                   | Cored Carbon Brush                             |                   |               |               |                 |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive   |                   |               |               |                 |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                    |                   |               |               |                 |
| Operating Voltage                            | At 4.8V                                        | At 6.0V           |               |               |                 |
| Operating Speed at no Load                   | 353°/s (59RPM)                                 | 462°/s (77RPM)    |               |               |                 |
| Stall Torque                                 | 3.6kgcm (35.3Ncm)                              | 4.3kgcm (42.2Ncm) |               |               |                 |
| Peak Efficiency Torque                       | 0.7kgcm (6.9Ncm)                               | 0.9kgcm (8.8Ncm)  |               |               |                 |
| Rest Current                                 | 30mA                                           | 30mA              |               |               |                 |
| Running Current at no Load                   | 260mA                                          | 300mA             |               |               |                 |
| Stall Current                                | 1300mA                                         | 1600mA            |               |               |                 |
| Deadband Width                               | 4Step                                          | 4Step             |               |               |                 |
| Travel                                       | Travel / Command                               | 90° / 4096        |               |               |                 |
|                                              | Servo mode                                     | Left              | Center        | Right         |                 |
|                                              | Pos Command                                    | +1366             | +8192         | +15018        |                 |
|                                              | Pos [°]                                        | -150              | 0             | +150          |                 |
|                                              | Turn Mode                                      | Left              | Power On      | Right         |                 |
|                                              | Pos Command                                    | -16383            | 0             | +16383        |                 |
|                                              | Pos [°]                                        | -359              | 0             | +359          |                 |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                     |                   |               |               |                 |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                  |                   |               |               |                 |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                 |                   |               |               |                 |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII                        |                   |               |               |                 |
| Connector Wire Length                        | 300mm                                          |                   |               |               |                 |
| Connector Wire Gauge                         | 28AWG                                          |                   |               |               |                 |
| Connector Wire Strand Count                  | 20/0.08                                        |                   |               |               |                 |
| External Dimensions                          | 29.0 x 13.0 x 29.4mm                           |                   |               |               |                 |
| Weight*                                      | 22.7g                                          |                   |               |               |                 |
| Ball Bearing                                 | Single Ball Bearing                            |                   |               |               |                 |
| Case Material                                | Engineering Plastic                            |                   |               |               |                 |
| Gear Material                                | 5 Metal Gears                                  |                   |               |               |                 |
| Gear Train Backlash                          | Max. 0.5°                                      |                   |               |               |                 |
| Horn Gear Spline                             | 24T Ø6.0                                       |                   |               |               |                 |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I, M-X, M-O) |                   |               |               |                 |
| IP-Rating                                    | IP4X                                           |                   |               |               |                 |
| Revision                                     | Rev. 1.1 / 03.01.2024                          |                   |               |               |                 |
| Changelog                                    | -                                              |                   |               |               |                 |
|                                              |                                                |                   |               |               |                 |
| *of the servo only w/o horns and accessories |                                                |                   |               |               |                 |

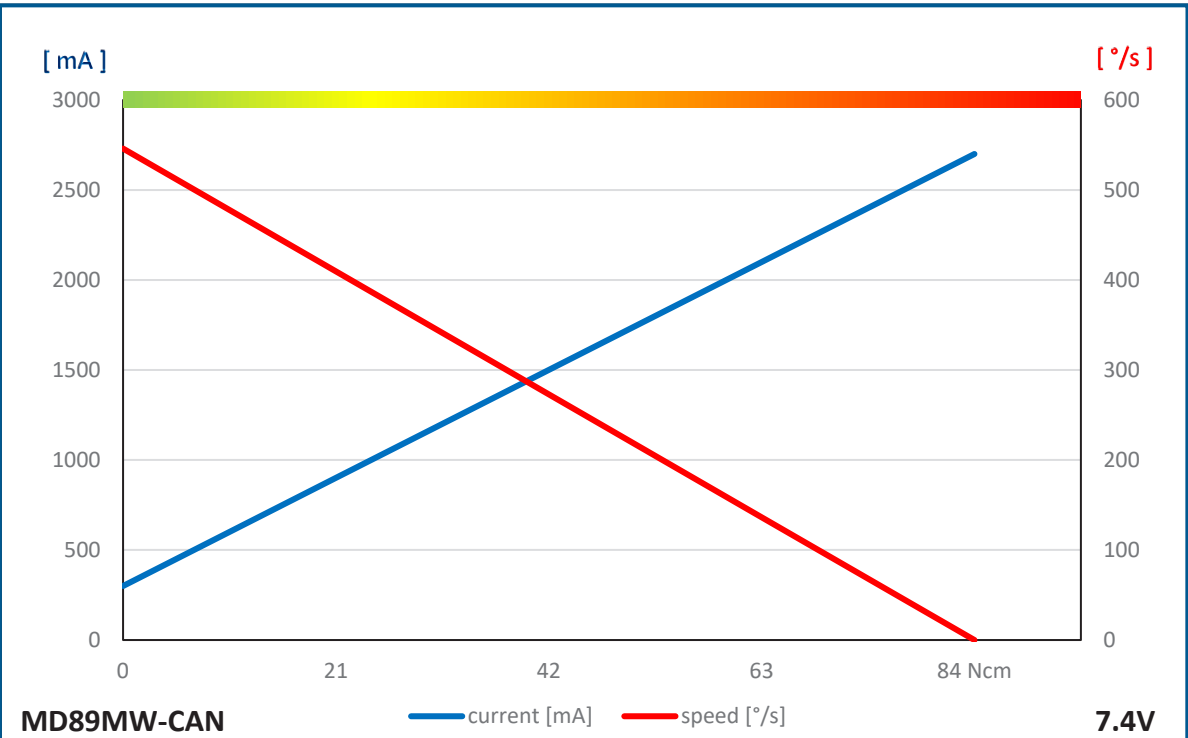


MD89MW-CAN/UAVCAN/DRONECAN

#1-01972,#1-01973



PERFORMANCE CHART



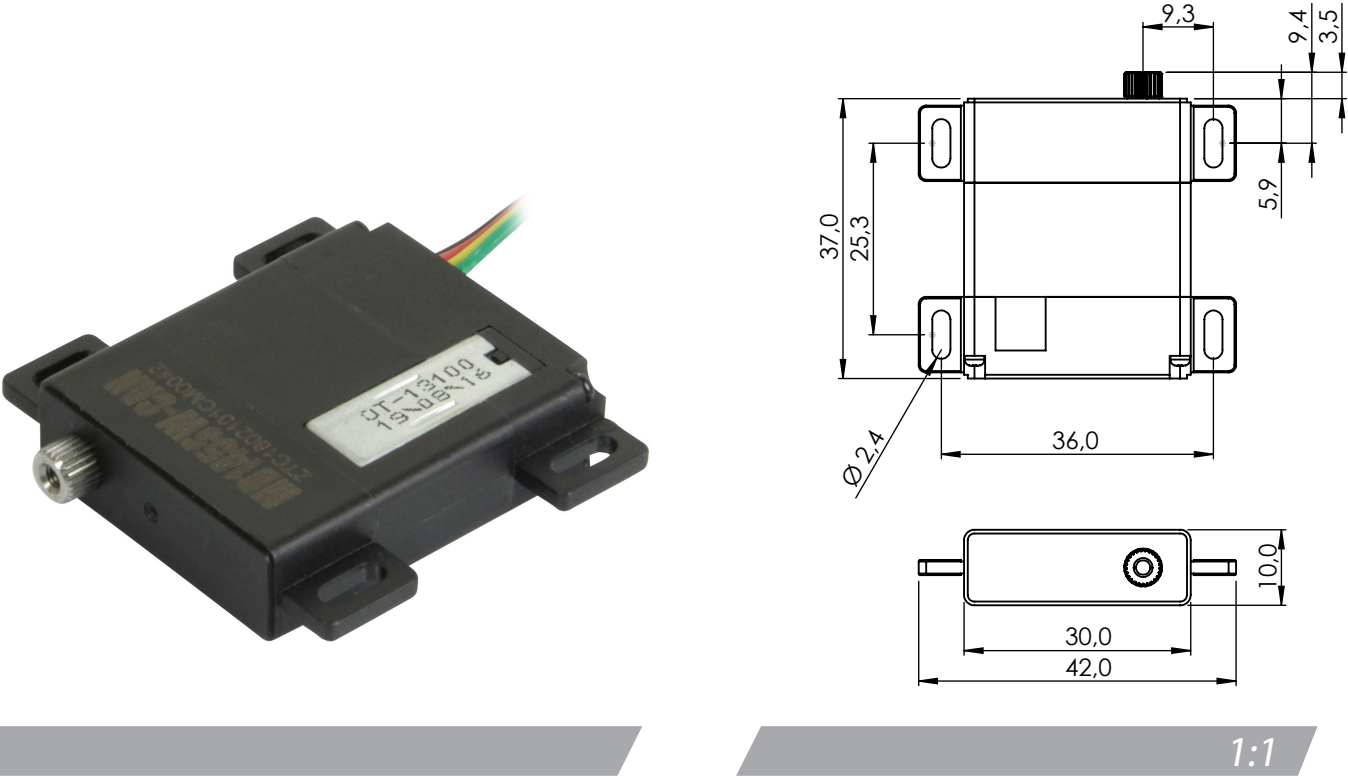
GENERAL SPECIFICATION

| MD89MW-CAN/UAVCANDroneCAN                    |                                                |                   |                   |               |                 |
|----------------------------------------------|------------------------------------------------|-------------------|-------------------|---------------|-----------------|
| Control System                               | CAN BUS                                        |                   |                   |               |                 |
|                                              | Protocol (Mode)                                | Standard 2.0A     |                   | Extended 2.0B | UAVCAN/DroneCAN |
|                                              | Baud-Rate                                      | 10kbps ~ 1Mbps    |                   |               |                 |
|                                              | Sample-Point                                   | 50% or 87.5%      |                   |               |                 |
|                                              | Available SERVO ID                             | 1 ~ 254           |                   |               | 1 ~ 127         |
|                                              | Available Node ID                              | 1 ~ 2047          | 1 ~ 536870911     |               | 1 ~ 127         |
|                                              | Input Signal Range                             | 0 ~ 5V            |                   |               |                 |
| Connector Type                               | Hitec 4P                                       |                   |                   |               |                 |
| Position Sensor Type                         | Contactless Magnetic Encoder                   |                   |                   |               |                 |
| Motor Type                                   | Coreless                                       |                   |                   |               |                 |
| Amplifier / MCU                              | 32bit programmable Digital                     |                   |                   |               |                 |
| Operating Voltage Range                      | 4.0 ~ 8.4V                                     |                   |                   |               |                 |
| Operating Voltage                            | At 4.8V                                        | At 6.0V           | At 7.4V           |               |                 |
| Operating Speed at no Load                   | 353°/s (59RPM)                                 | 462°/s (77RPM)    | 546°/s (91RPM)    |               |                 |
| Stall Torque                                 | 5.3kgcm (52.0Ncm)                              | 6.4kgcm (62.8Ncm) | 8.5kgcm (83.4Ncm) |               |                 |
| Peak Efficiency Torque                       | 1.1kgcm (10.8Ncm)                              | 1.3kgcm (12.8Ncm) | 1.7kgcm (16.7Ncm) |               |                 |
| Rest Current                                 | 30mA                                           | 30mA              | 30mA              |               |                 |
| Running Current at no Load                   | 200mA                                          | 250mA             | 300mA             |               |                 |
| Stall Current                                | 1800mA                                         | 2200mA            | 2700mA            |               |                 |
| Deadband Width                               | n/a                                            | n/a               | n/a               |               |                 |
| Travel                                       | Travel / Command                               | 90° / 4096        |                   |               |                 |
|                                              | Servo mode                                     | Left              | Center            | Right         |                 |
|                                              | Pos Command                                    | +1366             | +8192             | +15018        |                 |
|                                              | Pos [°]                                        | -150              | 0                 | +150          |                 |
|                                              | Turn Mode                                      | Left              | Power On          | Right         |                 |
|                                              | Pos Command                                    | -16383            | 0                 | +16383        |                 |
|                                              | Pos [°]                                        | -359              | 0                 | +359          |                 |
| Turn Range                                   | -32760 ~ +32760 (CAN only)                     |                   |                   |               |                 |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                  |                   |                   |               |                 |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                 |                   |                   |               |                 |
| Vibrations at no Load                        | -                                              |                   |                   |               |                 |
| Connector Wire Length                        | 300mm                                          |                   |                   |               |                 |
| Connector Wire Gauge                         | 22AWG                                          |                   |                   |               |                 |
| Connector Wire Strand Count                  | 60/0.08                                        |                   |                   |               |                 |
| External Dimensions                          | 28.9 x 13.0 x 30.0mm                           |                   |                   |               |                 |
| Weight*                                      | 28.0g                                          |                   |                   |               |                 |
| Ball Bearing                                 | Dual Ball Bearing                              |                   |                   |               |                 |
| Case Material                                | Engineering Plastic                            |                   |                   |               |                 |
| Gear Material                                | 5 Metal Gears                                  |                   |                   |               |                 |
| Gear Train Backlash                          | Max. 0.5°                                      |                   |                   |               |                 |
| Horn Gear Spline                             | 25T Ø6.0                                       |                   |                   |               |                 |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I, M-X, M-O) |                   |                   |               |                 |
| IP-Rating                                    | IP4X                                           |                   |                   |               |                 |
| Revision                                     | Rev. 1.1 / 03.01.2024                          |                   |                   |               |                 |
| Changelog                                    | -                                              |                   |                   |               |                 |
|                                              |                                                |                   |                   |               |                 |
| *of the servo only w/o horns and accessories |                                                |                   |                   |               |                 |

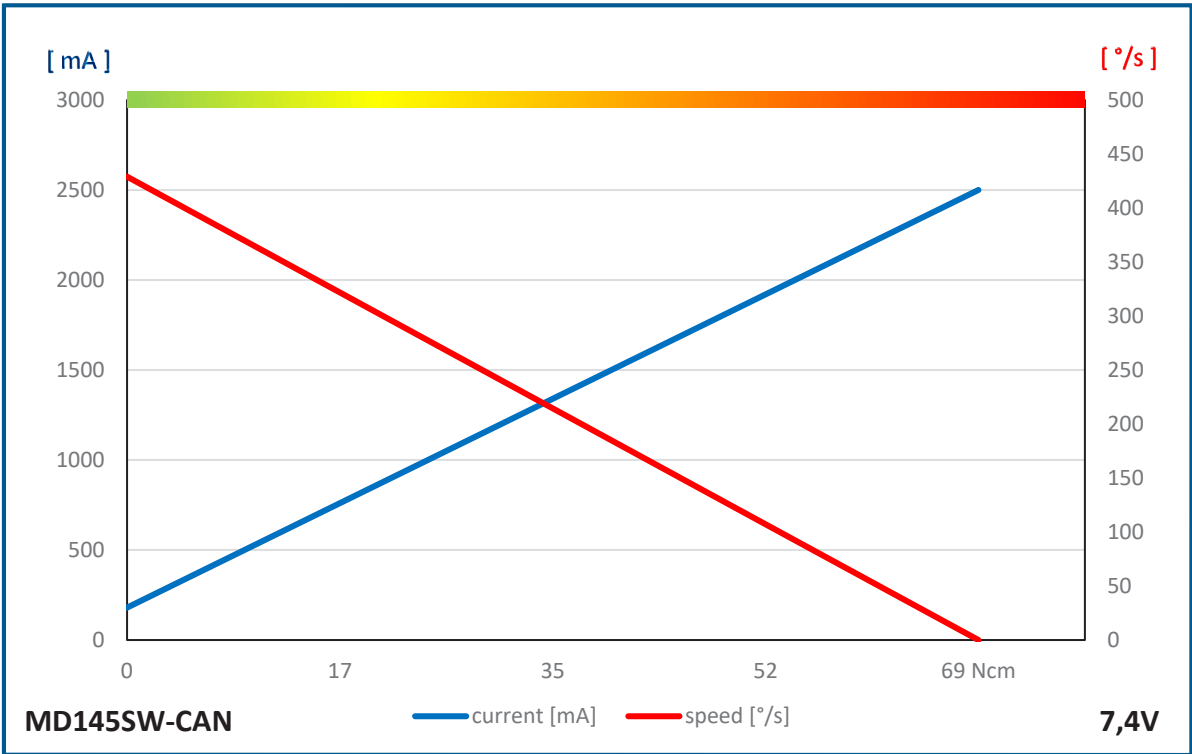
MD145SW-CAN/UAVCAN/DRONECAN

#1-01787,#1-01641

GENERAL SPECIFICATION



PERFORMANCE CHART

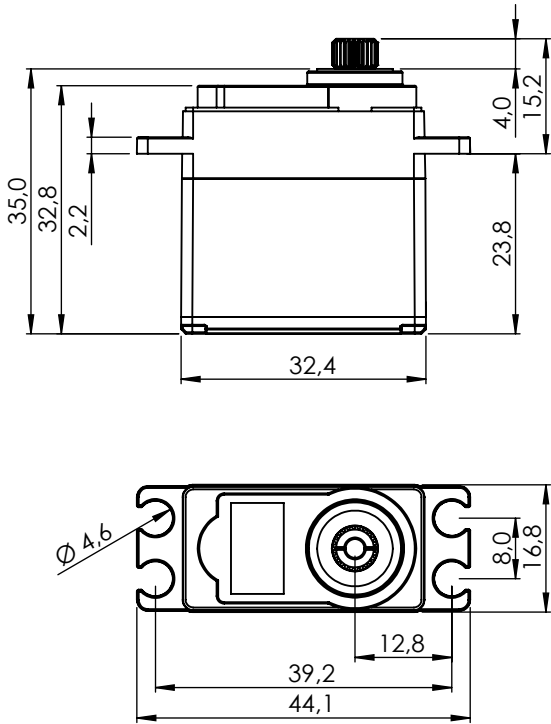


| MD145SW-CAN/UAVCAN/DroneCAN |                                                     |                |               |                 |
|-----------------------------|-----------------------------------------------------|----------------|---------------|-----------------|
| Control System              | CAN BUS                                             |                |               |                 |
|                             | Protocol (Mode)                                     | Standard 2.0A  | Extended 2.0B | UAVCAN/DroneCAN |
|                             | Baud-Rate                                           | 10kbps ~ 1Mbps |               |                 |
|                             | Sample-Point                                        | 50% or 87.5%   |               |                 |
|                             | Available SERVO ID                                  | 1 ~ 254        |               | 1 ~ 127         |
|                             | Available Node ID                                   | 1 ~ 2047       | 1 ~ 536870911 | 1 ~ 127         |
| Connector Type              | Hitec 4P                                            |                |               |                 |
|                             | Position Sensor Type                                |                |               |                 |
|                             | Contactless Magnetic Encoder                        |                |               |                 |
|                             | Motor Type                                          |                |               |                 |
|                             | Cored Carbon Brush                                  |                |               |                 |
|                             | Amplifier / MCU                                     |                |               |                 |
| Operating Voltage Range     | 32bit programmable Digital                          |                |               |                 |
|                             | 4.0V ~ 8.4V                                         |                |               |                 |
|                             | Operating Voltage                                   |                |               |                 |
|                             | At 4.8VAt 6.0VAt 7.4V                               |                |               |                 |
|                             | Operating Speed at no Load                          |                |               |                 |
|                             | 286°/s (48RPM)353°/s (59RPM)429°/s (71RPM)          |                |               |                 |
| Stall Torque                | 4.9kgcm (16.7Ncm)5.9kgcm (57.9Ncm)7.0kgcm (68.7Ncm) |                |               |                 |
|                             | Peak Efficiency Torque                              |                |               |                 |
|                             | 1.0kgcm (9.8Ncm)1.2kgcm (11.8Ncm)1.4kgcm (13.7Ncm)  |                |               |                 |
|                             | Rest Current                                        |                |               |                 |
|                             | 30mA30mA30mA                                        |                |               |                 |
|                             | Running Current at no Load                          |                |               |                 |
| Deadband Width              | 120mA180mA180mA                                     |                |               |                 |
|                             | Stall Current                                       |                |               |                 |
|                             | 1,600mA2,500mA2,500mA                               |                |               |                 |
|                             | Deadband Width                                      |                |               |                 |
|                             | 45Step45Step45Step                                  |                |               |                 |
| Travel                      | Travel / Command                                    |                |               |                 |
|                             | 90° / 4096                                          |                |               |                 |
|                             | Servo mode                                          |                |               |                 |
|                             | LeftCenterRight                                     |                |               |                 |
|                             | Pos Command                                         |                |               |                 |
|                             | +1366+8192+15018                                    |                |               |                 |
| Operating Temperature Range | Pos [°]                                             |                |               |                 |
|                             | -1500+150                                           |                |               |                 |
|                             | Turn Mode                                           |                |               |                 |
|                             | LeftPower OnRight                                   |                |               |                 |
|                             | Pos Command                                         |                |               |                 |
|                             | -163830+16383                                       |                |               |                 |
| Storage Temperature Range   | Pos [°]                                             |                |               |                 |
|                             | -3590+359                                           |                |               |                 |
|                             | Turn Range                                          |                |               |                 |
|                             | -32760 ~ +32760 (CAN only)                          |                |               |                 |
|                             | Operating Temperature Range                         |                |               |                 |
|                             | -20°C ~ +60°C (-4°F ~ +140°F)                       |                |               |                 |
| Vibrations at no Load       | Storage Temperature Range                           |                |               |                 |
|                             | -30°C ~ +80°C (-31°F ~ +176°F)                      |                |               |                 |
|                             | Vibrations at no Load                               |                |               |                 |
|                             | MIL-STD-810G 514.6C-VII                             |                |               |                 |
|                             | Connector Wire Length                               |                |               |                 |
|                             | 300mm                                               |                |               |                 |
| Connector Wire Gauge        | Connector Wire Gauge                                |                |               |                 |
|                             | 24AWG                                               |                |               |                 |
|                             | Connector Wire Strand Count                         |                |               |                 |
|                             | 40/0.08                                             |                |               |                 |
|                             | External Dimensions                                 |                |               |                 |
|                             | 30.0 x 10.0 x 37.0mm                                |                |               |                 |
| Weight*                     | Weight*                                             |                |               |                 |
|                             | 27.6g                                               |                |               |                 |
|                             | Ball Bearing                                        |                |               |                 |
|                             | Dual Ball Bearing                                   |                |               |                 |
|                             | Case Material                                       |                |               |                 |
|                             | Engineering Plastic                                 |                |               |                 |
| Gear Material               | Gear Material                                       |                |               |                 |
|                             | 1 Metal-Plastic & 4 Steel Gears                     |                |               |                 |
|                             | Gear Train Backlash                                 |                |               |                 |
|                             | Max. 0.5°                                           |                |               |                 |
|                             | Horn Gear Spline                                    |                |               |                 |
|                             | 25T Ø5.0                                            |                |               |                 |
| Accessories                 | Accessories                                         |                |               |                 |
|                             | Mounting Hardware, Servo Horns (MS-L25, MS-ML25)    |                |               |                 |
|                             | IP-Rating                                           |                |               |                 |
|                             | IP4X                                                |                |               |                 |
|                             | Revision                                            |                |               |                 |
|                             | Rev. 1.1 / 03.01.2024                               |                |               |                 |
| Changelog                   | Changelog                                           |                |               |                 |
|                             | -                                                   |                |               |                 |
|                             |                                                     |                |               |                 |
|                             |                                                     |                |               |                 |
|                             |                                                     |                |               |                 |
|                             |                                                     |                |               |                 |

\*of the servo only w/o horns and accessories

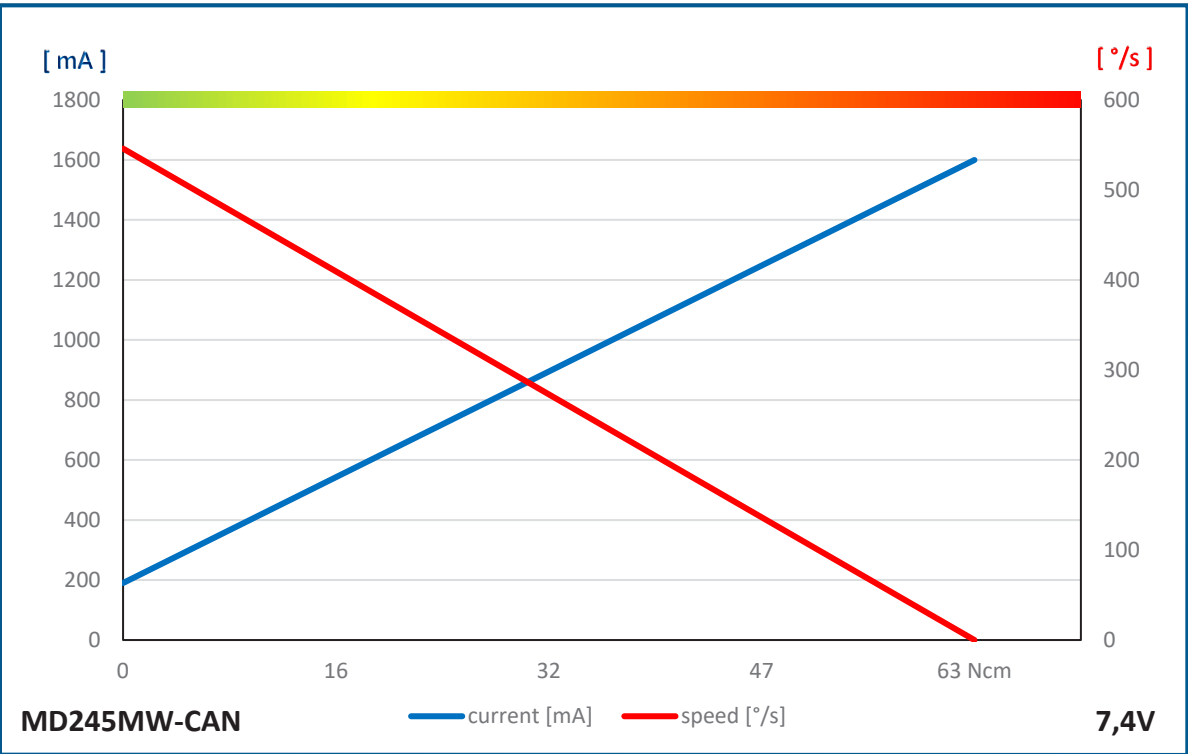
MD245MW-CAN/UAVCAN/DRONECAN

#1-01574,#1-01642



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PERFORMANCE CHART

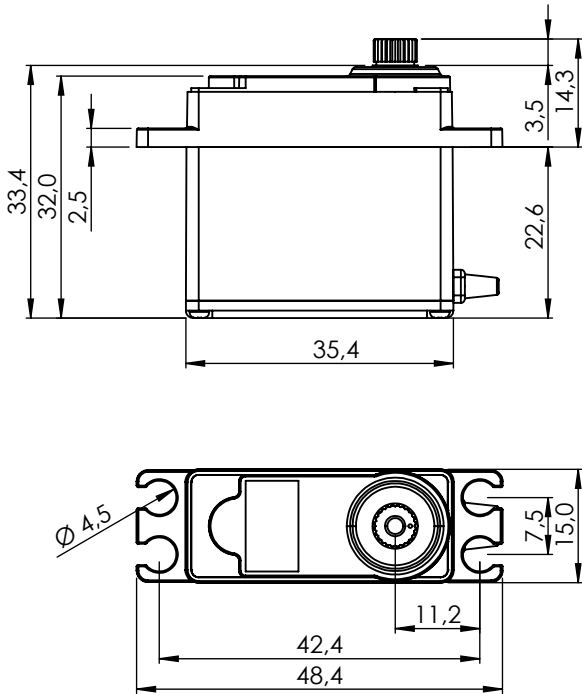


GENERAL SPECIFICATION

| MD245MW-CAN/UAVCAN/DroneCAN |                                              |                   |                   |                   |
|-----------------------------|----------------------------------------------|-------------------|-------------------|-------------------|
| Control System              | CAN BUS                                      |                   |                   |                   |
|                             | Protocol (Mode)                              | Standard 2.0A     | Extended 2.0B     | UAVCAN/DroneCAN   |
|                             | Baud-Rate                                    | 10kbps ~ 1Mbps    |                   |                   |
|                             | Sample-Point                                 | 50% or 87.5%      |                   |                   |
|                             | Available SERVO ID                           | 1 ~ 254           |                   | 1 ~ 127           |
|                             | Available Node ID                            | 1 ~ 2047          | 1 ~ 536870911     | 1 ~ 127           |
| Connector Type              | Hitec 4P                                     |                   |                   |                   |
|                             | Position Sensor Type                         |                   |                   |                   |
|                             | Contactless Magnetic Encoder                 |                   |                   |                   |
|                             | Motor Type                                   |                   |                   |                   |
|                             | Coreless Metal Brush                         |                   |                   |                   |
|                             | Amplifier / MCU                              |                   |                   |                   |
| Operating Voltage Range     | 32bit programmable Digital                   |                   |                   |                   |
|                             | 4.0V ~ 8.4V                                  |                   |                   |                   |
|                             | Operating Voltage                            | At 4.8V           | At 6.0V           | At 7.4V           |
|                             | Operating Speed at no Load                   | 353°/s (59RPM)    | 462°/s (77RPM)    | 546°/s (91RPM)    |
|                             | Stall Torque                                 | 4.2kgcm (41.2Ncm) | 5.2kgcm (51.0Ncm) | 6.4kgcm (62.8Ncm) |
|                             | Peak Efficiency Torque                       | 0.8kgcm (7.9Ncm)  | 1.0kgcm (9.8Ncm)  | 1.3kgcm (12.8Ncm) |
| Rest Current                | 30mA                                         |                   |                   |                   |
|                             | 30mA                                         |                   |                   |                   |
|                             | 30mA                                         |                   |                   |                   |
|                             | 110mA                                        |                   |                   |                   |
|                             | 150mA                                        |                   |                   |                   |
|                             | 190mA                                        |                   |                   |                   |
| Running Current at no Load  | 1000mA                                       |                   |                   |                   |
|                             | 1300mA                                       |                   |                   |                   |
|                             | 1600mA                                       |                   |                   |                   |
|                             | n/a                                          |                   |                   |                   |
|                             | n/a                                          |                   |                   |                   |
|                             | n/a                                          |                   |                   |                   |
| Deadband Width              | Travel / Command                             |                   |                   |                   |
|                             | 90° / 4096                                   |                   |                   |                   |
|                             | Servo mode                                   |                   |                   |                   |
|                             | Left                                         |                   |                   |                   |
|                             | Center                                       |                   |                   |                   |
|                             | Right                                        |                   |                   |                   |
| Travel                      | Pos Command                                  |                   |                   |                   |
|                             | +1366                                        |                   |                   |                   |
|                             | +8192                                        |                   |                   |                   |
|                             | +15018                                       |                   |                   |                   |
|                             | Pos [°]                                      |                   |                   |                   |
|                             | -150                                         |                   |                   |                   |
| Turn Mode                   | 0                                            |                   |                   |                   |
|                             | +150                                         |                   |                   |                   |
|                             | Turn Mode                                    |                   |                   |                   |
|                             | Left                                         |                   |                   |                   |
|                             | Power On                                     |                   |                   |                   |
|                             | Right                                        |                   |                   |                   |
| Pos Command                 | -16383                                       |                   |                   |                   |
|                             | +16383                                       |                   |                   |                   |
|                             | Pos [°]                                      |                   |                   |                   |
|                             | -359                                         |                   |                   |                   |
|                             | 0                                            |                   |                   |                   |
|                             | +359                                         |                   |                   |                   |
| Turn Range                  | -32760 ~ +32760 (CAN only)                   |                   |                   |                   |
|                             | Operating Temperature Range                  |                   |                   |                   |
|                             | -20°C ~ +60°C (-4°F ~ +140°F)                |                   |                   |                   |
|                             | Storage Temperature Range                    |                   |                   |                   |
|                             | -30°C ~ +80°C (-31°F ~ +176°F)               |                   |                   |                   |
|                             | Vibrations at no Load                        |                   |                   |                   |
| MIL-STD-810G 514.6C-VII     | Connector Wire Length                        |                   |                   |                   |
|                             | 300mm                                        |                   |                   |                   |
|                             | Connector Wire Gauge                         |                   |                   |                   |
|                             | 22AWG                                        |                   |                   |                   |
|                             | Connector Wire Strand Count                  |                   |                   |                   |
|                             | 60/0.08                                      |                   |                   |                   |
| External Dimensions         | 32.4 x 16.8 x 32.8mm                         |                   |                   |                   |
|                             | Weight*                                      |                   |                   |                   |
|                             | 35.5g                                        |                   |                   |                   |
|                             | Ball Bearing                                 |                   |                   |                   |
|                             | Dual Ball Bearing                            |                   |                   |                   |
|                             | Case Material                                |                   |                   |                   |
| Engineering Plastic         | Gear Material                                |                   |                   |                   |
|                             | 1 Metal-Plastic & 3 Metal Gears              |                   |                   |                   |
|                             | Gear Train Backlash                          |                   |                   |                   |
|                             | Max. 0.5°                                    |                   |                   |                   |
|                             | Horn Gear Spline                             |                   |                   |                   |
|                             | H25T Ø6.0                                    |                   |                   |                   |
| Accessories                 | Mounting Hardware, Servo Horn (M-025)        |                   |                   |                   |
|                             | IP-Rating                                    |                   |                   |                   |
|                             | IP4X                                         |                   |                   |                   |
|                             | Revision                                     |                   |                   |                   |
|                             | Rev. 1.1 / 03.01.2024                        |                   |                   |                   |
|                             | Changelog                                    |                   |                   |                   |
| -                           | *                                            |                   |                   |                   |
|                             | *of the servo only w/o horns and accessories |                   |                   |                   |

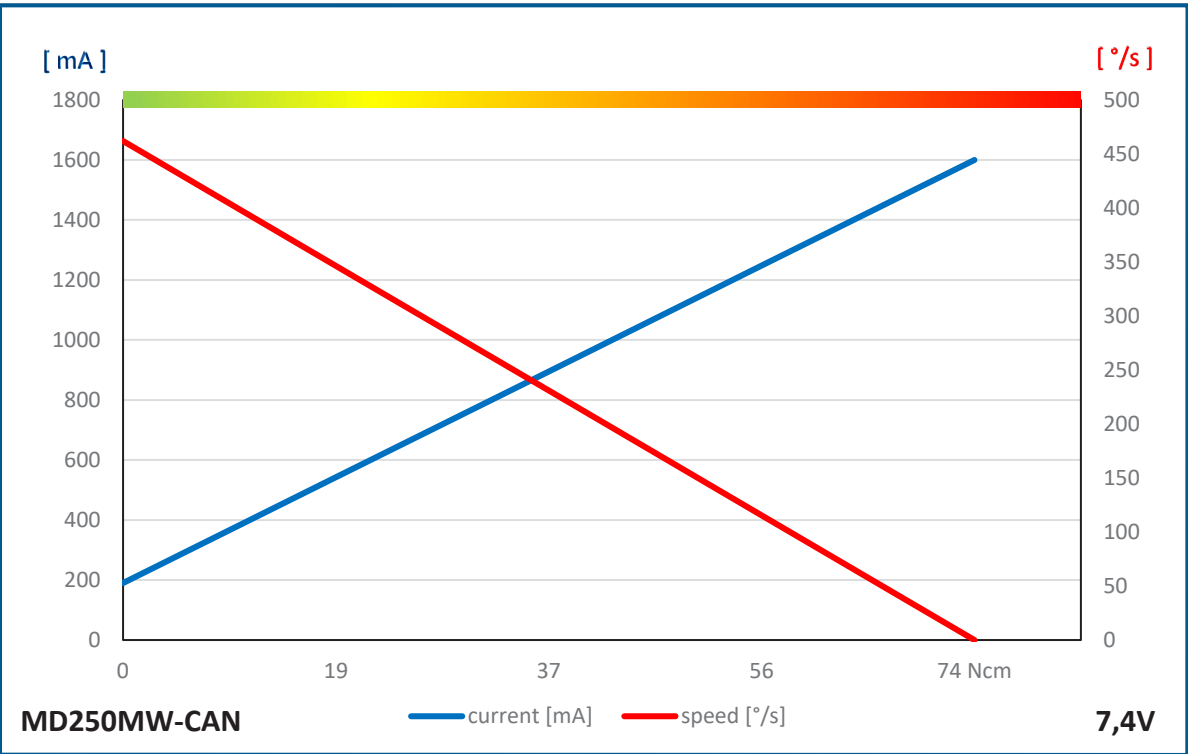
MD250MW-CAN/UAVCAN/DRONECAN

#1-01666,#1-01572



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PERFORMANCE CHART



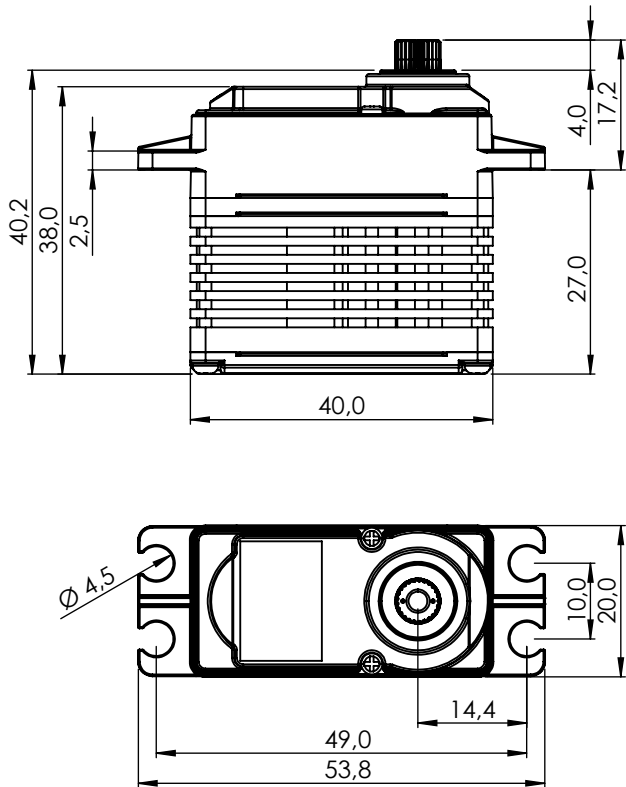
GENERAL SPECIFICATION

| MD250MW-CAN/UAVCAN/DroneCAN                  |                                       |                            |                   |               |                 |
|----------------------------------------------|---------------------------------------|----------------------------|-------------------|---------------|-----------------|
| Control System                               | CAN BUS                               |                            |                   |               |                 |
|                                              | Protocol (Mode)                       | Standard 2.0A              |                   | Extended 2.0B | UAVCAN/DroneCAN |
|                                              | Baud-Rate                             | 10kbps ~ 1Mbps             |                   |               |                 |
|                                              | Sample-Point                          | 50% or 87.5%               |                   |               |                 |
|                                              | Available SERVO ID                    | 1 ~ 254                    |                   |               | 1 ~ 127         |
|                                              | Available Node ID                     | 1 ~ 2047                   | 1 ~ 536870911     |               | 1 ~ 127         |
|                                              | Input Signal Range                    | 0 ~ 5V                     |                   |               |                 |
| Connector Type                               | Hitec 4P                              |                            |                   |               |                 |
| Position Sensor Type                         | Contactless Magnetic Encoder          |                            |                   |               |                 |
| Motor Type                                   | Cored Carbon Brush                    |                            |                   |               |                 |
| Amplifier / MCU                              | 32bit programmable Digital            |                            |                   |               |                 |
| Operating Voltage Range                      | 4.0V ~ 8.4V                           |                            |                   |               |                 |
| Operating Voltage                            | At 4.8V                               | At 6.0V                    | At 7.4V           |               |                 |
| Operating Speed at no Load                   | 300°/s (50RPM)                        | 375°/s (63RPM)             | 462°/s (77RPM)    |               |                 |
| Stall Torque                                 | 4.9kgcm (48.1Ncm)                     | 6.1kgcm (59.8Ncm)          | 7.5kgcm (73.6Ncm) |               |                 |
| Peak Efficiency Torque                       | 1.0kgcm (9.8Ncm)                      | 1.2kgcm (11.8Ncm)          | 1.5kgcm (14.7Ncm) |               |                 |
| Rest Current                                 | 40mA                                  | 40mA                       | 40mA              |               |                 |
| Running Current at no Load                   | 110mA                                 | 150mA                      | 190mA             |               |                 |
| Stall Current                                | 1000mA                                | 1300mA                     | 1600mA            |               |                 |
| Travel                                       | Travel / Command                      | 90° / 4096                 |                   |               |                 |
|                                              | Servo mode                            | Left                       | Center            | Right         |                 |
|                                              | Pos Command                           | +1366                      | +8192             | +15018        |                 |
|                                              | Pos [°]                               | -150                       | 0                 | +150          |                 |
|                                              | Turn Mode                             | Left                       | Power On          | Right         |                 |
|                                              | Pos Command                           | -16383                     | 0                 | +16383        |                 |
|                                              | Pos [°]                               | -359                       | 0                 | +359          |                 |
|                                              | Turn Range                            | -32760 ~ +32760 (CAN only) |                   |               |                 |
| Operating Temperature Range                  | -20°C ~ +60°C (-22°F ~ +140°F)        |                            |                   |               |                 |
| Storage Temperature Range                    | -30°C ~ +60°C (-80°F ~ +176°F)        |                            |                   |               |                 |
| Vibrations at no Load                        | MIL-STD-810G 514.6C-VII               |                            |                   |               |                 |
| Connector Wire Length                        | 300mm                                 |                            |                   |               |                 |
| Connector Wire Gauge                         | 22AWG                                 |                            |                   |               |                 |
| Connector Wire Strand Count                  | 60/0.08                               |                            |                   |               |                 |
| External Dimensions                          | 35.4 x 15.0 x 32.0mm                  |                            |                   |               |                 |
| Weight*                                      | 38.8g                                 |                            |                   |               |                 |
| Ball Bearing                                 | Dual Ball Bearing                     |                            |                   |               |                 |
| Case Material                                | Engineering Plastic                   |                            |                   |               |                 |
| Gear Material                                | 1 Metal-Plastic & 4 Steel Gears       |                            |                   |               |                 |
| Gear Train Backlash                          | Max. 0.5°                             |                            |                   |               |                 |
| Horn Gear Spline                             | H25T Ø6.0                             |                            |                   |               |                 |
| Accessories                                  | Mounting Hardware, Servo Horn (M-I25) |                            |                   |               |                 |
| IP-Rating                                    | IP4X                                  |                            |                   |               |                 |
| Revision                                     | Rev. 1.1 / 03.01.2024                 |                            |                   |               |                 |
| Changelog                                    | -                                     |                            |                   |               |                 |
|                                              |                                       |                            |                   |               |                 |
| *of the servo only w/o horns and accessories |                                       |                            |                   |               |                 |



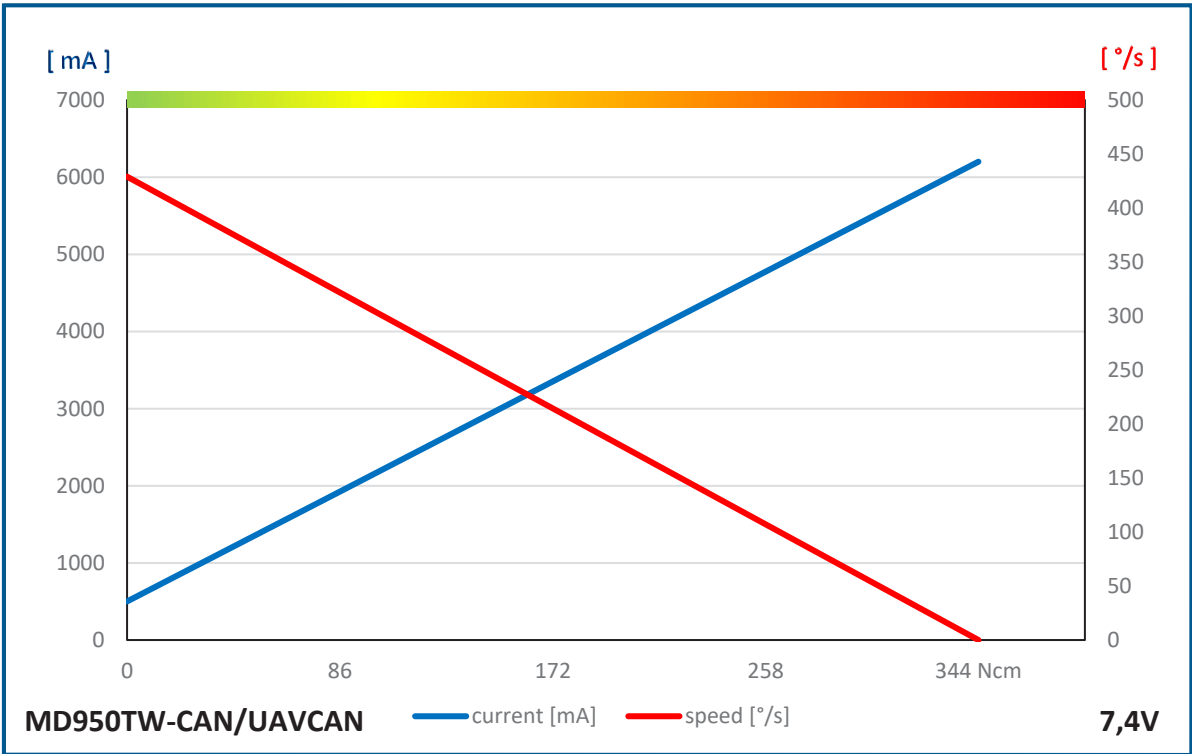
MD950TW-CAN/UAVCAN/DRONECAN

#1-01646,#1-01647



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PERFORMANCE CHART



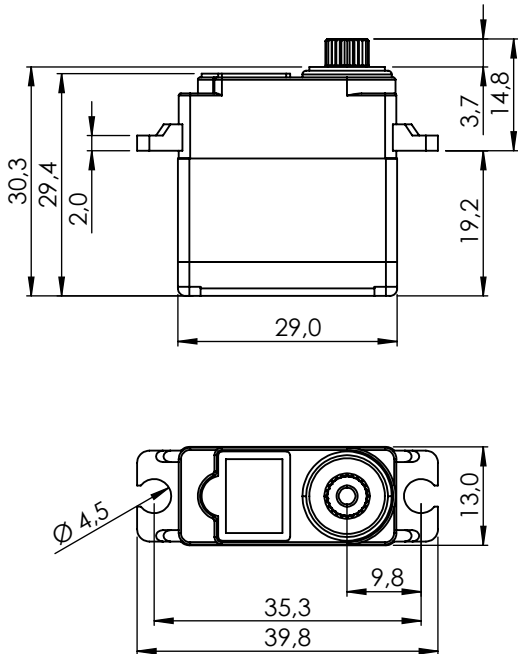
GENERAL SPECIFICATION

| MD950TW-CAN/UAVCAN                      |                                                                    |                     |                     |               |                 |
|-----------------------------------------|--------------------------------------------------------------------|---------------------|---------------------|---------------|-----------------|
| Control System                          | CAN BUS                                                            |                     |                     |               |                 |
|                                         | Protocol (Mode)                                                    | Standard 2.0A       |                     | Extended 2.0B | UAVCAN/DroneCAN |
|                                         | Baud-Rate                                                          | 10kbps ~ 1Mbps      |                     |               |                 |
|                                         | Sample-Point                                                       | 50% or 87.5%        |                     |               |                 |
|                                         | Available SERVO ID                                                 | 1 ~ 254             |                     |               | 1 ~ 127         |
|                                         | Available Node ID                                                  | 1 ~ 2047            | 1 ~ 536870911       |               | 1 ~ 127         |
|                                         | Input Signal Range                                                 | 0 ~ 5V              |                     |               |                 |
| Connector Type                          | Hitec 4P                                                           |                     |                     |               |                 |
| Position Sensor Type                    | Contactless Magnetic Encoder                                       |                     |                     |               |                 |
| Motor Type                              | Coreless                                                           |                     |                     |               |                 |
| Amplifier / MCU                         | 32bit programmable Digital                                         |                     |                     |               |                 |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                                        |                     |                     |               |                 |
| Operating Voltage                       | At 4.8V                                                            | At 6.0V             | At 7.4V             |               |                 |
| Operating Speed at no Load              | 261°/s (44RPM)                                                     | 353°/s (59RPM)      | 429°/s (72RPM)      |               |                 |
| Stall Torque                            | 21.0kgcm (206.0Ncm)                                                | 29.0kgcm (284.5Ncm) | 35.0kgcm (343.4Ncm) |               |                 |
| Peak Efficiency Torque                  | 4.2kgcm (41.2Ncm)                                                  | 5.8kgcm (56.9Ncm)   | 7.0kgcm (68.7Ncm)   |               |                 |
| Rest Current                            | 30mA                                                               | 30mA                | 30mA                |               |                 |
| Running Current at no Load              | 300mA                                                              | 390mA               | 500mA               |               |                 |
| Stall Current                           | 3700mA                                                             | 4800mA              | 6200mA              |               |                 |
| Deadband Width                          | 4Step                                                              | 4Step               | 4Step               |               |                 |
| Travel                                  | Travel / Command                                                   | 90° / 4096          |                     |               |                 |
|                                         | Servo mode                                                         | Left                | Center              | Right         |                 |
|                                         | Pos Command                                                        | +1366               | +8192               | +15018        |                 |
|                                         | Pos [°]                                                            | -150                | 0                   | +150          |                 |
|                                         | Turn Mode                                                          | Left                | Power On            | Right         |                 |
|                                         | Pos Command                                                        | -16383              | 0                   | +16383        |                 |
|                                         | Pos [°]                                                            | -359                | 0                   | +359          |                 |
| Turn Range                              | -32760 ~ +32760 (CAN only)                                         |                     |                     |               |                 |
| Operating Temperature Range             | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |                     |               |                 |
| Storage Temperature Range               | -30°C ~ +80°C (-31°F ~ +176°F)                                     |                     |                     |               |                 |
| Vibrations at no Load                   | MIL-STD-810G 514.6C-VII                                            |                     |                     |               |                 |
| Connector Wire Length                   | 300mm                                                              |                     |                     |               |                 |
| Connector Wire Gauge                    | 20AWG                                                              |                     |                     |               |                 |
| Connector Wire Strand Count             | 80/0.08                                                            |                     |                     |               |                 |
| Extrenal Dimensions                     | 40.0 x 20.0 x 38.0mm                                               |                     |                     |               |                 |
| Weight*                                 | 66.4g                                                              |                     |                     |               |                 |
| Ball Bearing                            | Dual Ball Bearing                                                  |                     |                     |               |                 |
| Case Material                           | Engineering Plastic & Aluminum Heatsink                            |                     |                     |               |                 |
| Gear Material                           | 1 Metal-Plastic & 3 Titanium Alloy Gears                           |                     |                     |               |                 |
| Gear Train Backlash                     | Max. 0.5°                                                          |                     |                     |               |                 |
| Horn Gear Spline                        | H25T Ø6.0                                                          |                     |                     |               |                 |
| Accessories                             | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |                     |               |                 |
| IP-Rating                               | IP54                                                               |                     |                     |               |                 |
| Revision                                | Rev. 1.1 / 03.01.2024                                              |                     |                     |               |                 |
| Changelog                               | -                                                                  |                     |                     |               |                 |
| *of the servo w/o horns and accessories |                                                                    |                     |                     |               |                 |



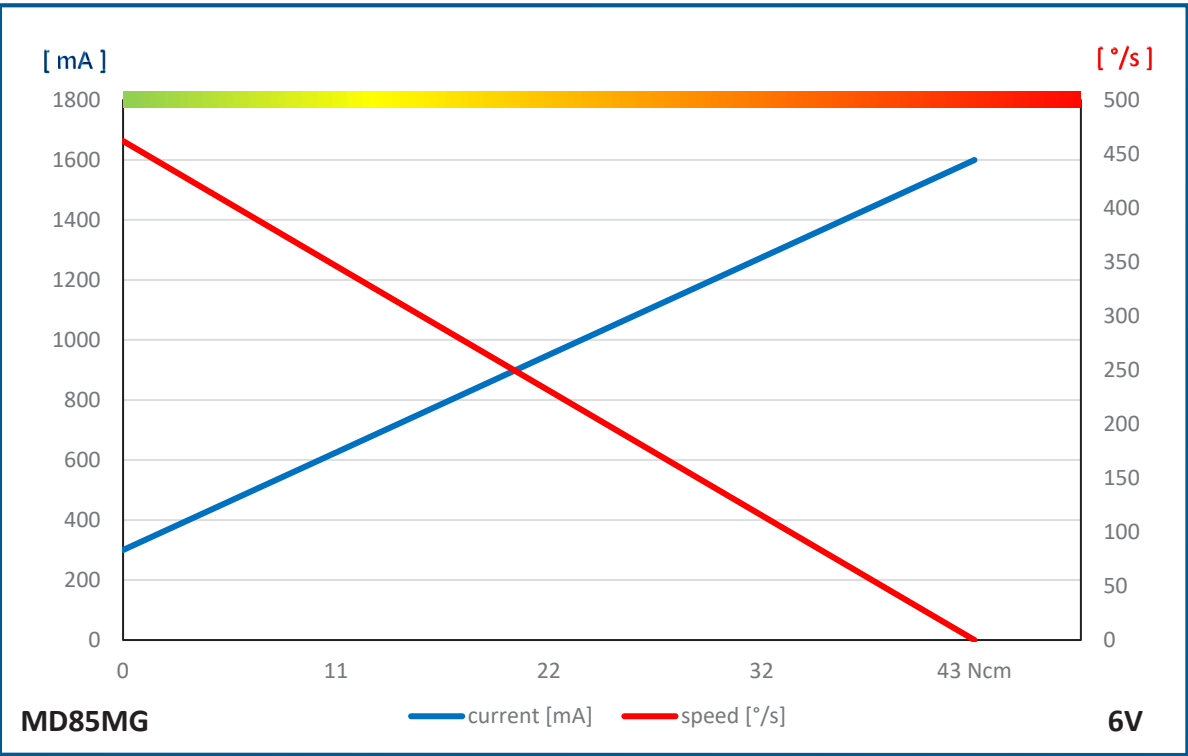
MD85MG

#1-01656



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PERFORMANCE CHART

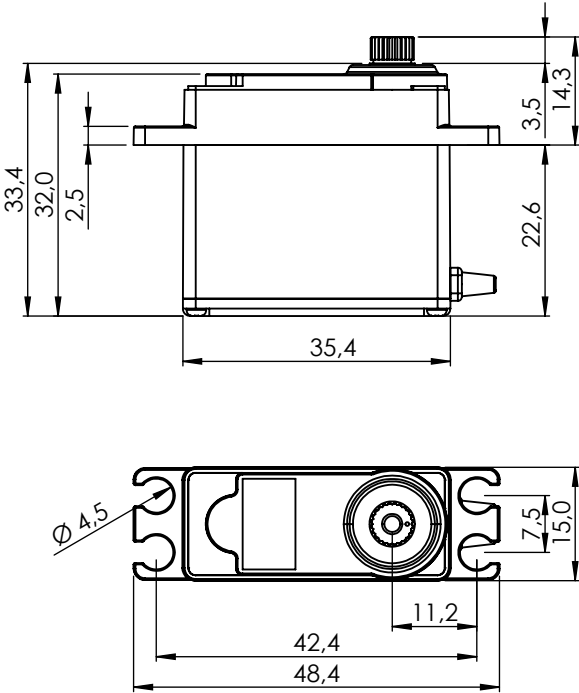


GENERAL SPECIFICATION

| MD85MG                                       |                                                        |                   |
|----------------------------------------------|--------------------------------------------------------|-------------------|
| Control System                               | PWM / TTL (Half Duplex)                                |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs               |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                            |                   |
| Position Sensor Type                         | Contactless Magnetic Encoder                           |                   |
| Motor Type                                   | Cored Carbon Brush                                     |                   |
| Amplifier / MCU                              | 32bit programmable Digital Amplifier with Mosfet Drive |                   |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                            |                   |
| Operating Voltage                            | At 4.8V                                                | At 6.0V           |
| Operating Speed at no Load                   | 353°/s (59RPM)                                         | 462°/s (77RPM)    |
| Stall Torque                                 | 3.6kgcm (35.3Ncm)                                      | 4.3kgcm (42.2Ncm) |
| Peak Efficiency Torque                       | 0.7kgcm (6.9Ncm)                                       | 0.9kgcm (8.8Ncm)  |
| Rest Current                                 | 30mA                                                   | 30mA              |
| Running Current at no Load                   | 260mA                                                  | 300mA             |
| Stall Current                                | 1300mA                                                 | 1600mA            |
| Deadband Width                               | 2µs                                                    | 2µs               |
| Operating Travel                             | Default                                                | ±60°              |
|                                              | Programmable                                           | Max. 320°         |
|                                              | Multi Turn/Continuous Rotation                         | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                          |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                          |                   |
| Vibrations at no Load                        | -                                                      |                   |
| Connector Wire Length                        | 250mm                                                  |                   |
| Connector Wire Gauge                         | 28AWG                                                  |                   |
| Connector Wire Strand Count                  | 20/0.08                                                |                   |
| External Dimensions                          | 29.0 x 13.0 x 29.4mm                                   |                   |
| Weight*                                      | 21.5g                                                  |                   |
| Ball Bearing                                 | Single Ball Bearing                                    |                   |
| Case Material                                | Engineering Plastic                                    |                   |
| Gear Material                                | 5 Metal Gears                                          |                   |
| Gear Train Backlash                          | Max. 0.5°                                              |                   |
| Horn Gear Spline                             | 24T Ø6.0                                               |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I, M-X, M-O)         |                   |
| IP-Rating                                    | IP4X                                                   |                   |
| Revision                                     | Rev. 1.1 / 03.01.2024                                  |                   |
| Changelog                                    | -                                                      |                   |
|                                              |                                                        |                   |
| *of the servo only w/o horns and accessories |                                                        |                   |

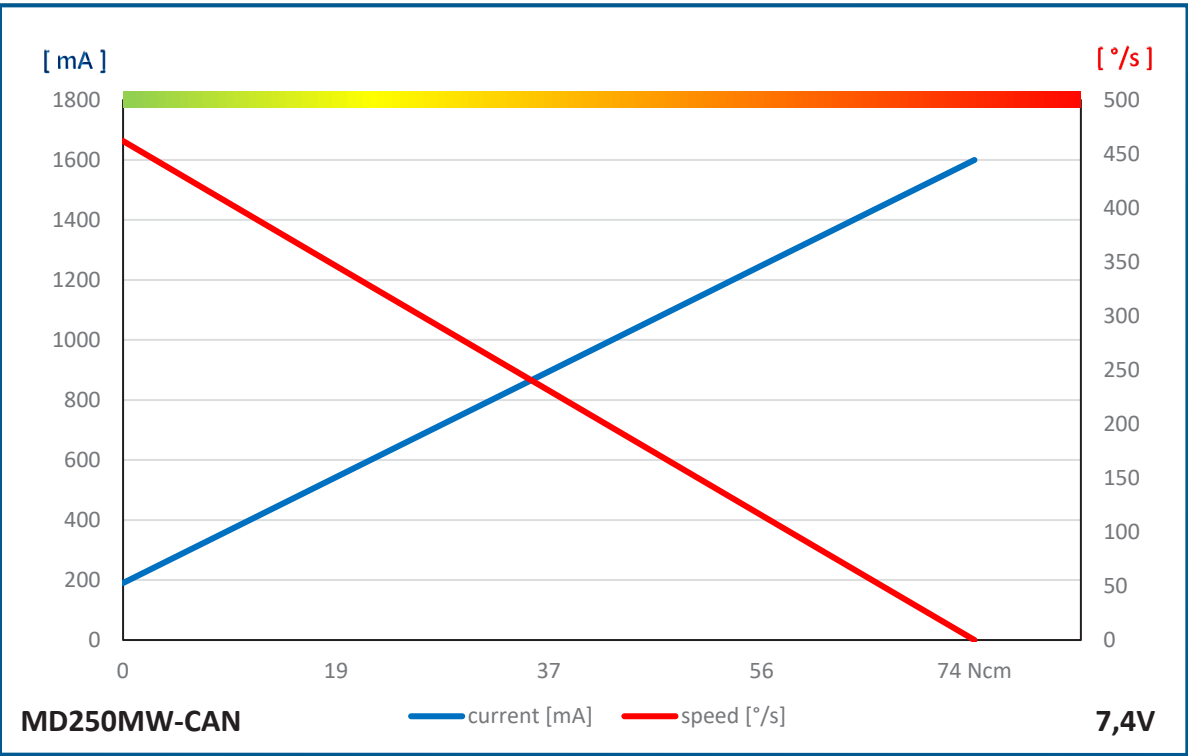
MD250MW

#1-00707



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PERFORMANCE CHART

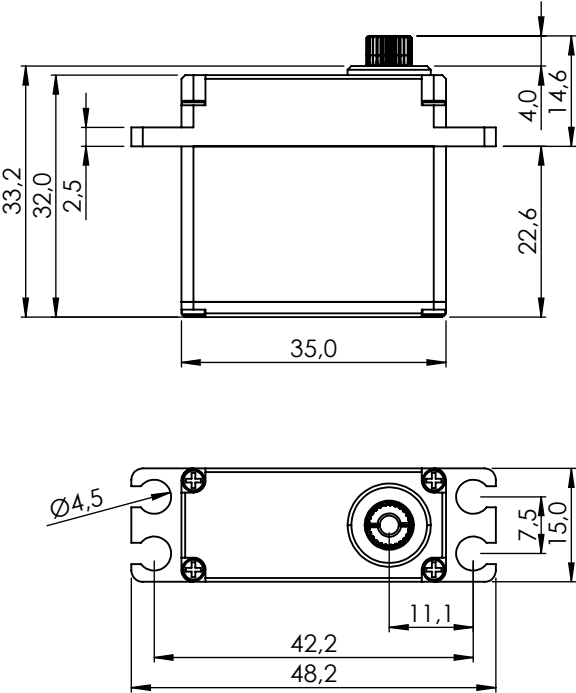


GENERAL SPECIFICATION

| MD250MW                                      |                                                |                   |                   |
|----------------------------------------------|------------------------------------------------|-------------------|-------------------|
| Control System                               | PWM / TTL (Half Duplex)                        |                   |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs       |                   |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                    |                   |                   |
| Position Sensor Type                         | Contactless Magnetic Encoder                   |                   |                   |
| Motor Type                                   | Cored Carbon Brush                             |                   |                   |
| Amplifier / MCU                              | 32Bit programmable Digital with Mosfet Drive   |                   |                   |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                    |                   |                   |
| Operating Voltage                            | At 4.8V                                        | At 6.0V           | At 7.4V           |
| Operating Speed at no Load                   | 300°/s (50RPM)                                 | 375°/s (63RPM)    | 462°/s (77RPM)    |
| Stall Torque                                 | 4.9kgcm (48.1Ncm)                              | 6.1kgcm (59.8Ncm) | 7.5kgcm (73.6Ncm) |
| Peak Efficiency Torque                       | 1.0kgcm (9.8Ncm)                               | 1.2kgcm (11.8Ncm) | 1.5kgcm (14.7Ncm) |
| Rest Current                                 | 40mA                                           | 40mA              | 40mA              |
| Running Current at no Load                   | 110mA                                          | 150mA             | 190mA             |
| Stall Current                                | 1000mA                                         | 1300mA            | 1600mA            |
| Deadband Width                               | 2µs                                            | 2µs               | 2µs               |
| Operating Travel                             | Default                                        | ±60°              |                   |
|                                              | Programmable                                   | Max. 320°         |                   |
|                                              | Multi Turn/Continuous Rotation                 | n/a / n/a         |                   |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                  |                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                  |                   |                   |
| Vibrations at no Load                        | -                                              |                   |                   |
| Connector Wire Length                        | 300mm                                          |                   |                   |
| Connector Wire Gauge                         | 22AWG                                          |                   |                   |
| Connector Wire Strand Count                  | 60/0.08                                        |                   |                   |
| External Dimensions                          | 35.4 x 15.0 x 32.0mm                           |                   |                   |
| Weight*                                      | 38.3g                                          |                   |                   |
| Ball Bearing                                 | Dual Ball Bearing                              |                   |                   |
| Case Material                                | Engineering Plastic                            |                   |                   |
| Gear Material                                | 1 Metal-Plastic & 4 Steel Gears                |                   |                   |
| Gear Train Backlash                          | Max. 0.5°                                      |                   |                   |
| Horn Gear Spline                             | H25T Ø6.0                                      |                   |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I25, R-ML25) |                   |                   |
| IP-Rating                                    | IP4X                                           |                   |                   |
| Revision                                     | Rev. 1.1 / 03.01.2024                          |                   |                   |
| Changelog                                    | -                                              |                   |                   |
|                                              |                                                |                   |                   |
| *of the servo only w/o horns and accessories |                                                |                   |                   |
|                                              |                                                |                   |                   |

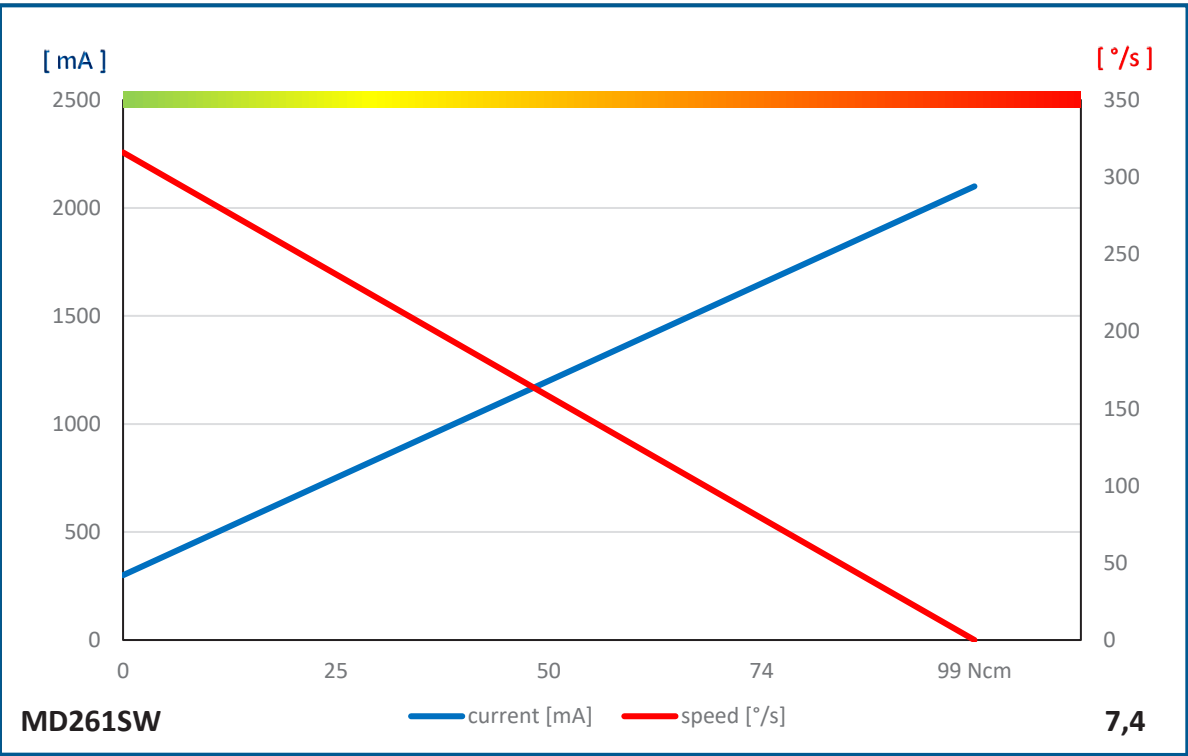
MD261SW

#1-03052



1:1

PERFORMANCE CHART

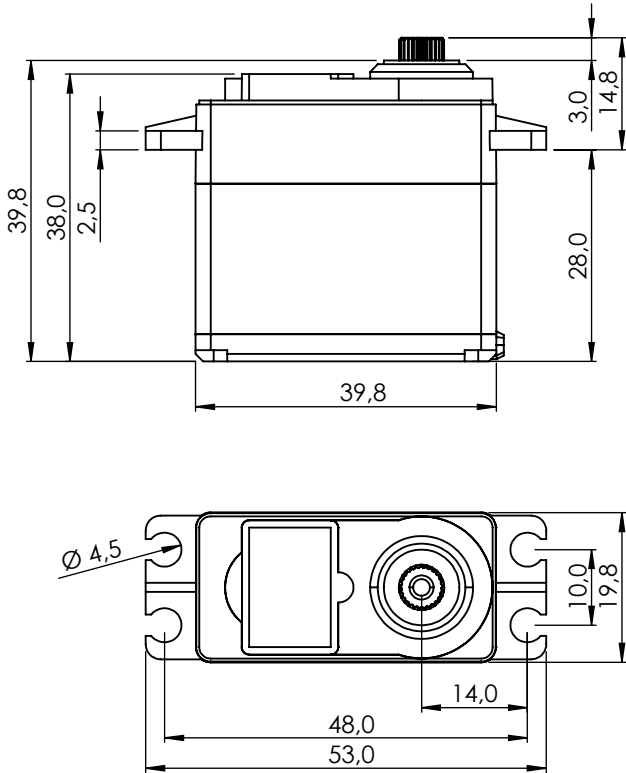


GENERAL SPECIFICATION

| MD261SW                                      |                                          |                   |                    |
|----------------------------------------------|------------------------------------------|-------------------|--------------------|
| Control System                               | PWM / TTL (Half Duplex)                  |                   |                    |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs |                   |                    |
| Connector Type                               | Hitec 3P (JR 3P compatible)              |                   |                    |
| Position Sensor Type                         | Contactless Magnetic Encoder             |                   |                    |
| Motor Type                                   | Cored Carbon Brush                       |                   |                    |
| Amplifier / MCU                              | 32bit programmable Digital               |                   |                    |
| Operating Voltage Range                      | 3.5V ~ 8.4V                              |                   |                    |
| Operating Voltage                            | At 4.8V                                  | At 6.0V           | At 7.4V            |
| Operating Speed at no Load                   | 200°/s (33RPM)                           | 261°/s (44RPM)    | 316°/s (53RPM)     |
| Stall Torque                                 | 6.5kgcm (63.7Ncm)                        | 8.1kgcm (79.5Ncm) | 10.0kgcm (98.1Ncm) |
| Peak Efficiency Torque                       | 1.3kgcm (12.8Ncm)                        | 1.6kgcm (15.7Ncm) | 2.0kgcm (19.6Ncm)  |
| Rest Current                                 | 30mA                                     | 30mA              | 30mA               |
| Running Current at no Load                   | 220mA                                    | 260mA             | 300mA              |
| Stall Current                                | 1400mA                                   | 1700mA            | 2100mA             |
| Deadband Width                               | 2µs                                      | 2µs               | 2µs                |
| Opearting Travel                             | Default                                  | ±60°              |                    |
|                                              | Programmable                             | Max. 320°         |                    |
|                                              | Multi Turn/Continuous Rotation           | n/a / n/a         |                    |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)            |                   |                    |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)            |                   |                    |
| Vibrations at no Load                        | -                                        |                   |                    |
| Connector Wire Length                        | 300mm                                    |                   |                    |
| Connector Wire Gauge                         | 22AWG                                    |                   |                    |
| Connector Wire Strand Count                  | 60/0.08                                  |                   |                    |
| External Dimensions                          | 35.0 x 15.0 x 32.0mm                     |                   |                    |
| Weight*                                      | 50.6g                                    |                   |                    |
| Ball Bearing                                 | Dual Ball Bearing                        |                   |                    |
| Case Material                                | Aluminum Alloy                           |                   |                    |
| Gear Material                                | 5 Steel Gears                            |                   |                    |
| Gear Train Backlash                          | Max. 0.5°                                |                   |                    |
| Horn Gear Spline                             | H25T Ø6.0                                |                   |                    |
| Accessories                                  | Mounting Hardware, Servo Horn (M-I25)    |                   |                    |
| IP-Rating                                    | IP4X                                     |                   |                    |
| Revision                                     | Rev. 1.0 / 05.01.2024                    |                   |                    |
| Changelog                                    | -                                        |                   |                    |
|                                              |                                          |                   |                    |
| *of the servo only w/o horns and accessories |                                          |                   |                    |
|                                              |                                          |                   |                    |

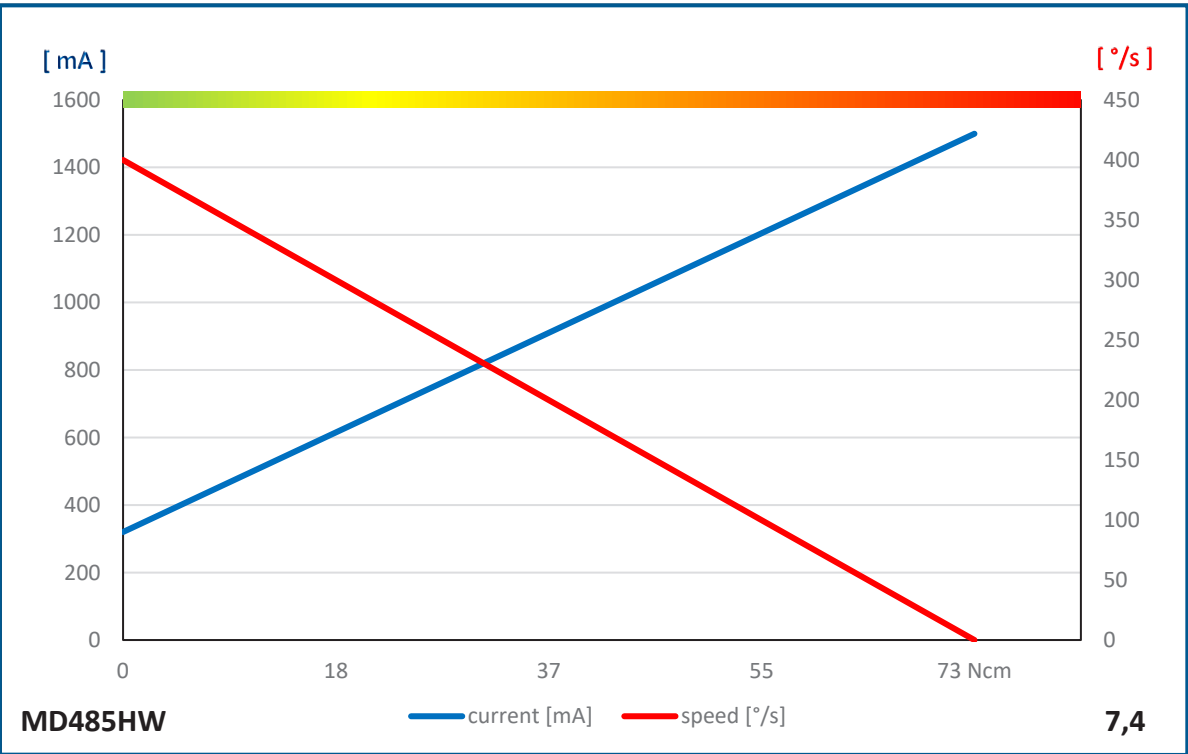
MD485HW

#1-01924  
#1-02363 GP 30 Stück



1:1

PERFORMANCE CHART

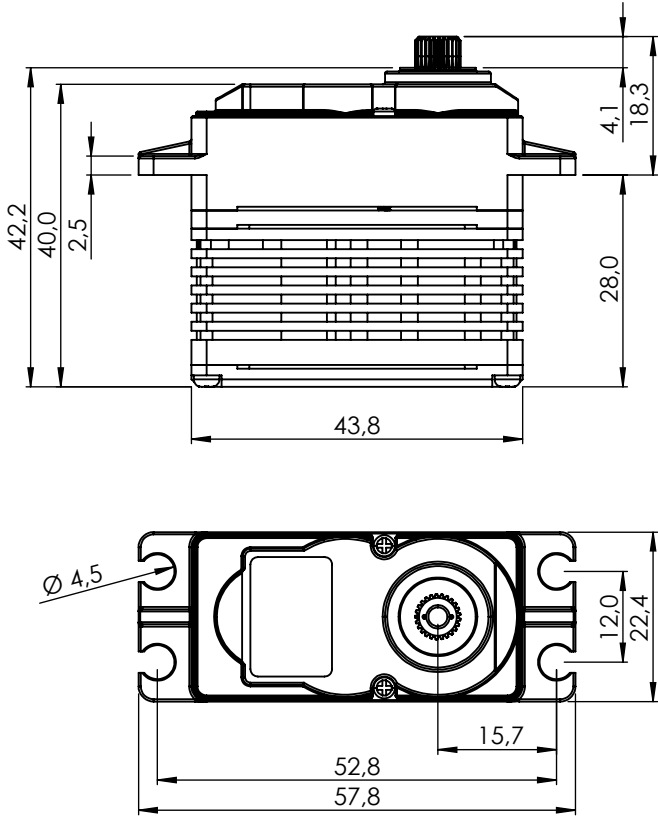


GENERAL SPECIFICATION

| MD485HW                                      |                                                                    |                   |                   |
|----------------------------------------------|--------------------------------------------------------------------|-------------------|-------------------|
| Control System                               | PWM / TTL (Half Duplex)                                            |                   |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                           |                   |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                        |                   |                   |
| Position Sensor Type                         | Contactless Magnetic Encoder                                       |                   |                   |
| Motor Type                                   | Cored Carbon Brush                                                 |                   |                   |
| Amplifier / MCU                              | 32bit Programmable Digital Mosfet Drive                            |                   |                   |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                                        |                   |                   |
| Operating Voltage                            | At 4.8V                                                            | At 6.0V           | At 7.4V           |
| Operating Speed at no Load                   | 300°/s (50RPM)                                                     | 353°/s (59RPM)    | 400°/s (67RPM)    |
| Stall Torque                                 | 4.8kgcm (47.1Ncm)                                                  | 6.0kgcm (58.8Ncm) | 7.4kgcm (72.6Ncm) |
| Peak Efficiency Torque                       | 1.0kgcm (9.8Ncm)                                                   | 1.2kgcm (11.8Ncm) | 1.5kgcm (14.7Ncm) |
| Rest Current                                 | 30mA                                                               | 30mA              | 30mA              |
| Running Current at no Load                   | 250mA                                                              | 280mA             | 320mA             |
| Stall Current                                | 1000mA                                                             | 1200mA            | 1500mA            |
| Deadband Width                               | 2µs                                                                | 2µs               | 2µs               |
| Operating Travel                             | Default                                                            | ±60°              |                   |
|                                              | Programmable                                                       | Max. 320°         |                   |
|                                              | Multi Turn/Continuous Rotation                                     | n/a / n/a         |                   |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                      |                   |                   |
| Vibrations at no Load                        | -                                                                  |                   |                   |
| Connector Wire Length                        | 300mm                                                              |                   |                   |
| Connector Wire Gauge                         | 24AWG                                                              |                   |                   |
| Connector Wire Strand Count                  | 40/0.08                                                            |                   |                   |
| External Dimensions                          | 39.8 x 19.8 x 38.0mm                                               |                   |                   |
| Weight*                                      | 43.3g                                                              |                   |                   |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                   |                   |
| Case Material                                | Engineering Plastic                                                |                   |                   |
| Gear Material                                | 4 Heavy Duty Resin Gears                                           |                   |                   |
| Gear Train Backlash                          | Max. 0.5°                                                          |                   |                   |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                   |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                   |                   |
| IP-Rating                                    | IP4X                                                               |                   |                   |
| Revision                                     | Rev. 1.1 / 03.01.2024                                              |                   |                   |
| Changelog                                    | -                                                                  |                   |                   |
|                                              |                                                                    |                   |                   |
| *of the servo only w/o horns and accessories |                                                                    |                   |                   |
|                                              |                                                                    |                   |                   |

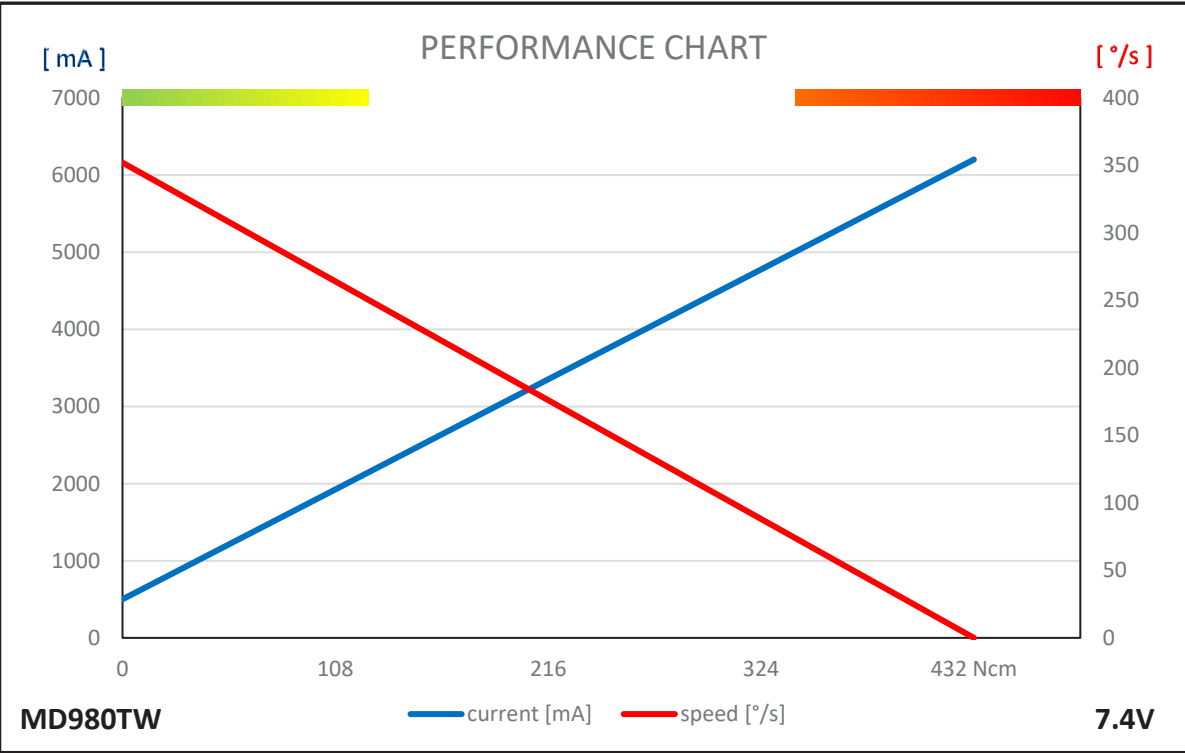
MD980TW

# 1-03166



GENERAL SPECIFICATION

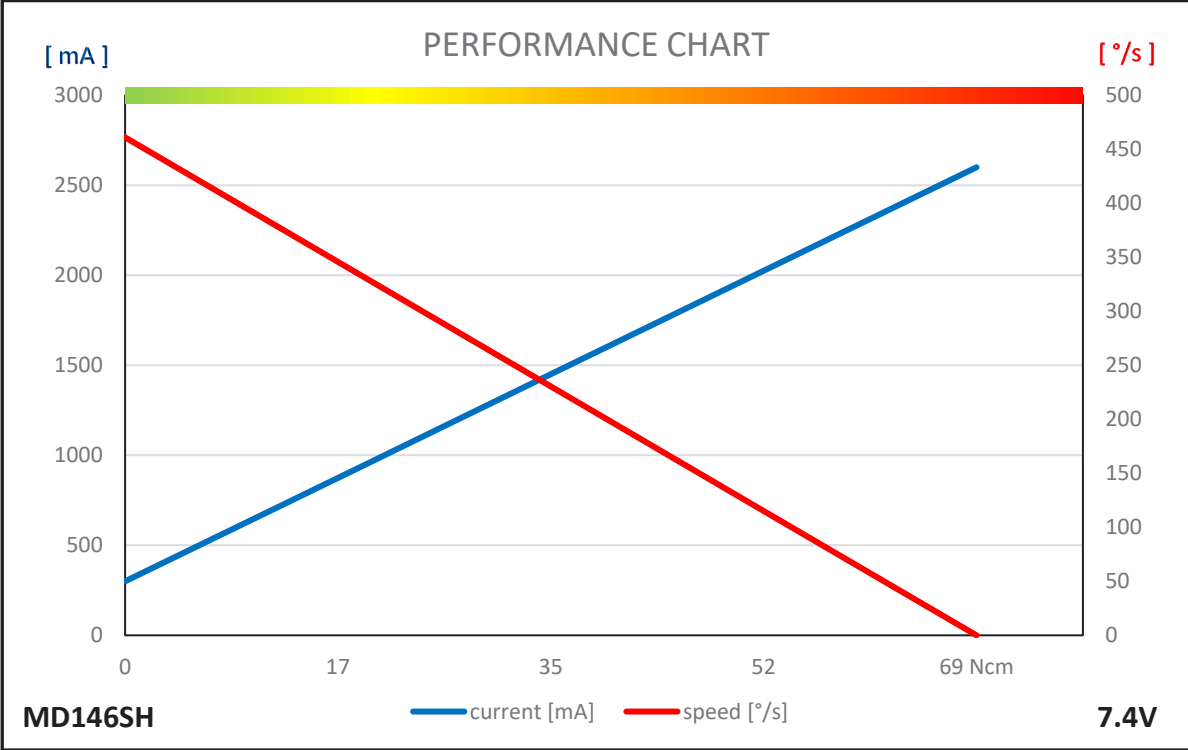
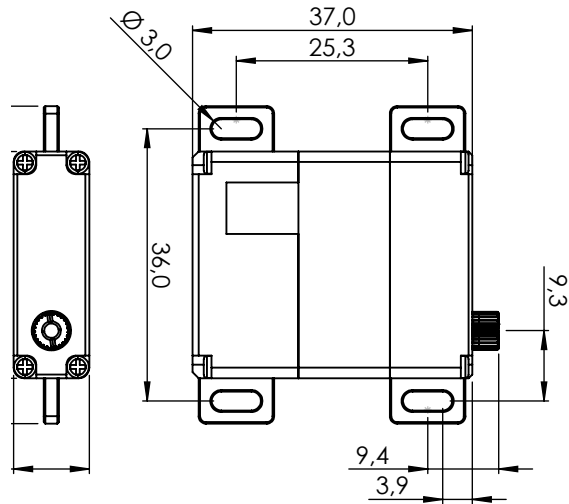
| MD980TW                     |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                          |                          |
| Motor Type                  | Coreless                                                                       |                          |                          |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | 4.8V                                                                           | 6.0V                     | 7.4V                     |
| No Load Speed               | 0.28sec/60°                                                                    | 0.21sec/60°              | 0.17sec/60°              |
| Stall Torque                | 26.0kgf·cm (361.07oz·in)                                                       | 36.0kgf·cm (499.95oz·in) | 44.0kgf·cm (611.05oz·in) |
| Peak Efficiency Torque      | 5.2kgf·cm (72.21oz·in)                                                         | 7.2kgf·cm (99.99oz·in)   | 8.8kgf·cm (122.21oz·in)  |
| Standing Current            | 30mA                                                                           | 30mA                     | 30mA                     |
| No Load Running Current     | 300mA                                                                          | 390mA                    | 500mA                    |
| Stall Current               | 4,200mA                                                                        | 4,800mA                  | 6,200mA                  |
| Deadband                    | 1μs                                                                            | 1μs                      | 1μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 320° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 43.8mm x 22.4mm x 40.0mm (1.724inch x 0.882inch x 1.575inch)                   |                          |                          |
| Weight                      | 75.8g (2.674oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering Plastic                                                            |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Titanium Alloy Gears                                       |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 25T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP54                                                                           |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                                     |                          |                          |





MD146SH

# 1-03090

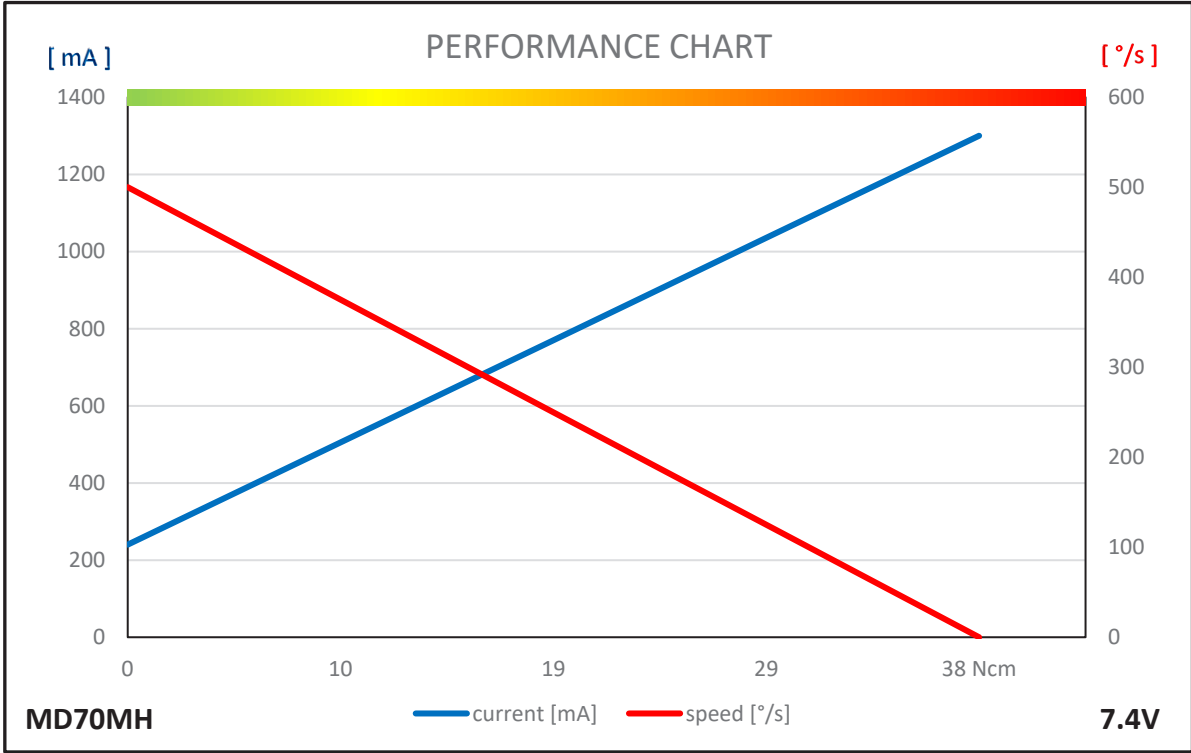
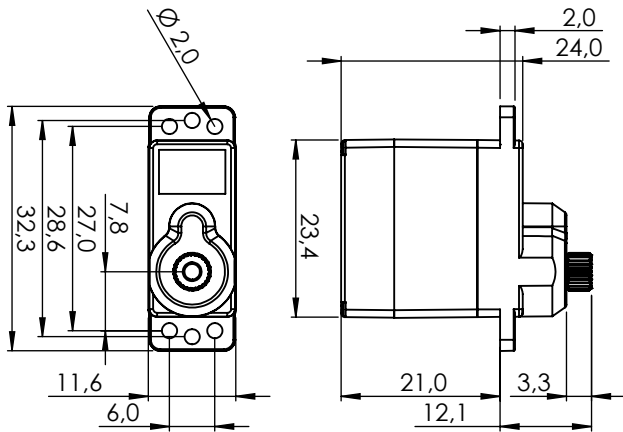


GENERAL SPECIFICATION

| MD146SH                     |                                                                                |                        |                        |
|-----------------------------|--------------------------------------------------------------------------------|------------------------|------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                        |                        |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                        |                        |
| Motor Type                  | Cored Carbon Brush                                                             |                        |                        |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                        |                        |
| Voltage                     | -                                                                              | 6.0V                   | 7.4V                   |
| No Load Speed               | -                                                                              | 0.15sec/60°            | 0.13sec/60°            |
| Stall Torque                | -                                                                              | 5.9kgf·cm (81.94oz·in) | 7.0kgf·cm (97.21oz·in) |
| Peak Efficiency Torque      | -                                                                              | 1.2kgf·cm (16.39oz·in) | 1.4kgf·cm (19.44oz·in) |
| Standing Current            | -                                                                              | 30mA                   | 30mA                   |
| No Load Running Current     | -                                                                              | 250mA                  | 300mA                  |
| Stall Current               | -                                                                              | 2,100mA                | 2,600mA                |
| Deadband                    | -                                                                              | 2µs                    | 2µs                    |
| Operating Travel            | Default: ±60°, Programmable: Max 320° / Pulse Width: 900~2100µs(Center:1500µs) |                        |                        |
| Continuous Rotation         | n/a                                                                            |                        |                        |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                        |                        |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                        |                        |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                        |                        |
| Connector Wire Gauge        | 24AWG                                                                          |                        |                        |
| Dimensions                  | 30.0mm x 10.0mm x 37.0mm (1.181inch x 0.394inch x 1.457inch)                   |                        |                        |
| Weight                      | 31.0g (1.093oz)                                                                |                        |                        |
| Bearing Type                | 2 Ball Bearing                                                                 |                        |                        |
| Case Material               | Aluminum Alloy                                                                 |                        |                        |
| Gear Material               | 1 Metal-Plastic & 4 Steel Gears                                                |                        |                        |
| Gear Train Backlash         | Max 0.5°                                                                       |                        |                        |
| Horn Gear Spline            | M25T(Ø5)                                                                       |                        |                        |
| IP-Rating                   | IP4X                                                                           |                        |                        |
| Servo Amplifier Type        | 32bit Programmable Digital                                                     |                        |                        |

MD70MH

# 1-03277

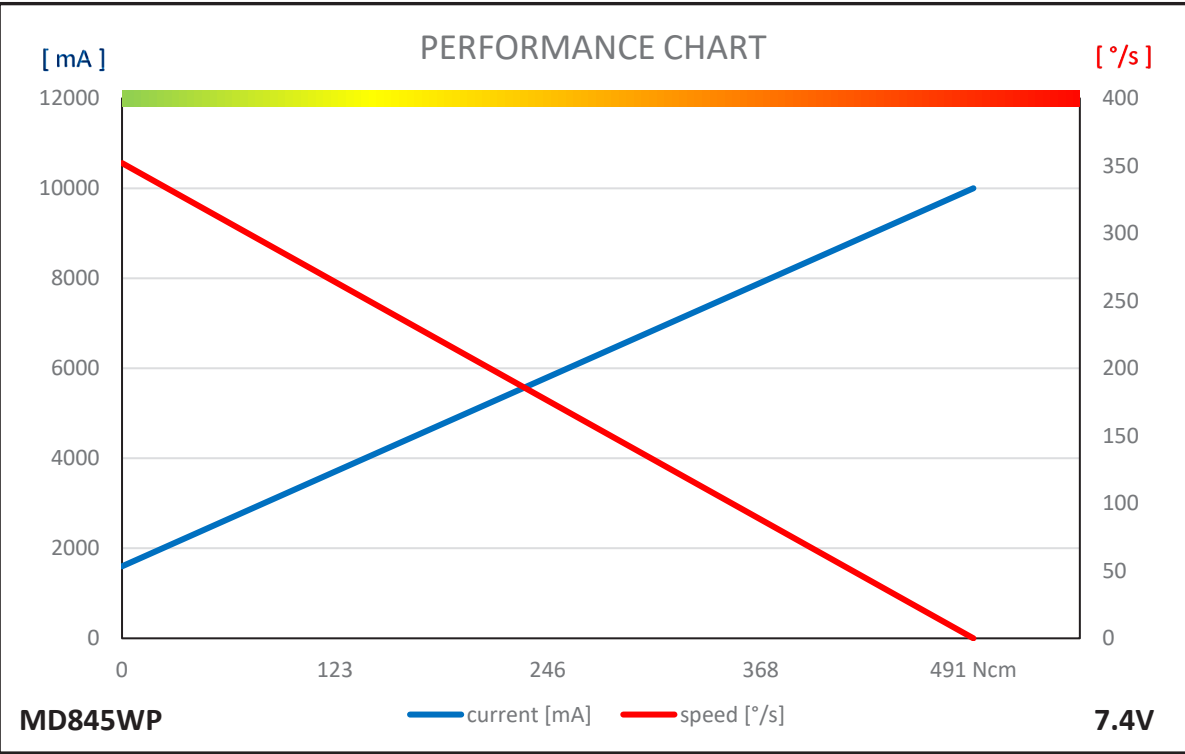
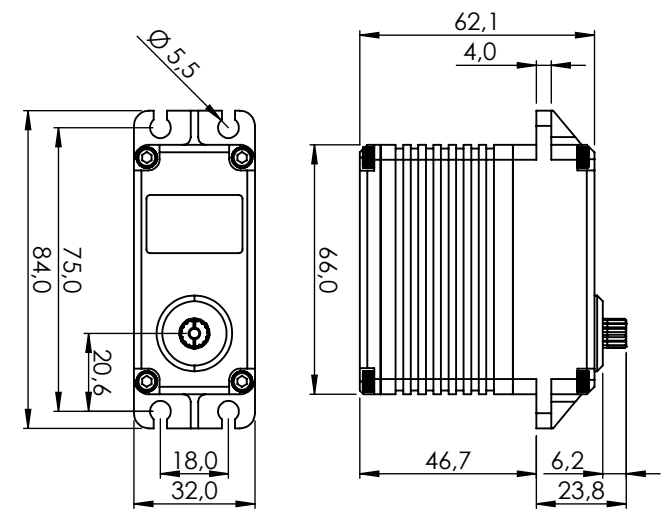


GENERAL SPECIFICATION

| MD70MH                      |                                                                                |                        |                        |
|-----------------------------|--------------------------------------------------------------------------------|------------------------|------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                        |                        |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                        |                        |
| Motor Type                  | Cored Metal Brush                                                              |                        |                        |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                        |                        |
| Voltage                     | -                                                                              | 6.0V                   | 7.4V                   |
| No Load Speed               | -                                                                              | 0.15sec/60°            | 0.12sec/60°            |
| Stall Torque                | -                                                                              | 3.1kgf·cm (43.05oz·in) | 3.8kgf·cm (52.77oz·in) |
| Peak Efficiency Torque      | -                                                                              | 0.6kgf·cm ( 8.33oz·in) | 0.8kgf·cm (11.11oz·in) |
| Standing Current            | -                                                                              | 30mA                   | 30mA                   |
| No Load Running Current     | -                                                                              | 200mA                  | 240mA                  |
| Stall Current               | -                                                                              | 1,000mA                | 1,300mA                |
| Deadband                    | -                                                                              | 2µs                    | 2µs                    |
| Operating Travel            | Default: ±60°, Programmable: Max 320° / Pulse Width: 900~2100µs(Center:1500µs) |                        |                        |
| Continuous Rotation         | n/a                                                                            |                        |                        |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                        |                        |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                        |                        |
| Connector Wire Length       | 160mm (6.299inch)                                                              |                        |                        |
| Connector Wire Gauge        | 28AWG                                                                          |                        |                        |
| Dimensions                  | 23.6mm x 11.6mm x 30.0mm (0.929inch x 0.457inch x 1.181inch)                   |                        |                        |
| Weight                      | 13.0g (0.459oz)                                                                |                        |                        |
| Bearing Type                | 1 Ball Bearing                                                                 |                        |                        |
| Case Material               | Engineering Plastic                                                            |                        |                        |
| Gear Material               | 1 Heavy Duty Resin & 4 Metal Gears                                             |                        |                        |
| Gear Train Backlash         | Max 0.5°                                                                       |                        |                        |
| Horn Gear Spline            | M25T(Ø5)                                                                       |                        |                        |
| IP-Rating                   | IP4X                                                                           |                        |                        |
| Servo Amplifier Type        | 32bit programmable Digital                                                     |                        |                        |

MD845WP

# 1-03227

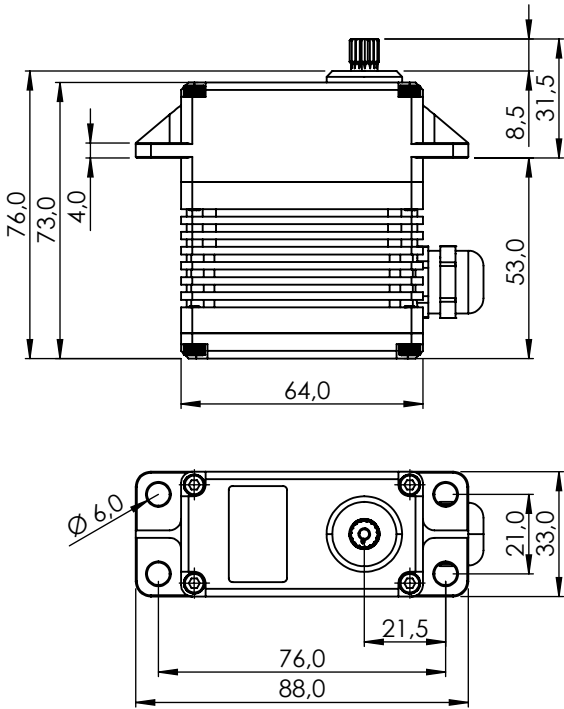


GENERAL SPECIFICATION

| MD845WP                     |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM/TTL(Half Duplex)                                                           |                          |                          |
| Position Sensor Type        | Contactless Magnetic Encoder                                                   |                          |                          |
| Motor Type                  | Cored Carbon Brush                                                             |                          |                          |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | 4.8V                                                                           | 6.0V                     | 7.4V                     |
| No Load Speed               | 0.26sec/60°                                                                    | 0.21sec/60°              | 0.17sec/60°              |
| Stall Torque                | 32.5kgf·cm (451.34oz·in)                                                       | 40.5kgf·cm (562.44oz·in) | 50.0kgf·cm (694.37oz·in) |
| Peak Efficiency Torque      | 6.5kgf·cm (90.27oz·in)                                                         | 8.1kgf·cm (112.49oz·in)  | 10.0kgf·cm (138.87oz·in) |
| Standing Current            | 30mA                                                                           | 30mA                     | 30mA                     |
| No Load Running Current     | 1,100mA                                                                        | 1,250mA                  | 1,600mA                  |
| Stall Current               | 6,000mA                                                                        | 7,000mA                  | 10,000mA                 |
| Deadband                    | 2μs                                                                            | 2μs                      | 2μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 320° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 20AWG                                                                          |                          |                          |
| Dimensions                  | 66.0mm x 32.0mm x 62.1mm (2.598inch x 1.260inch x 2.445inch)                   |                          |                          |
| Weight                      | 228.9g (8.074oz)                                                               |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering Plastic & Aluminum Heat Sink                                       |                          |                          |
| Gear Material               | 1 Metal-Plastic & 4 Steel Gears                                                |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 15T(Ø8)                                                                        |                          |                          |
| IP-Rating                   | IP67                                                                           |                          |                          |
| Servo Amplifier Type        | 32bit programmable Digital                                                     |                          |                          |

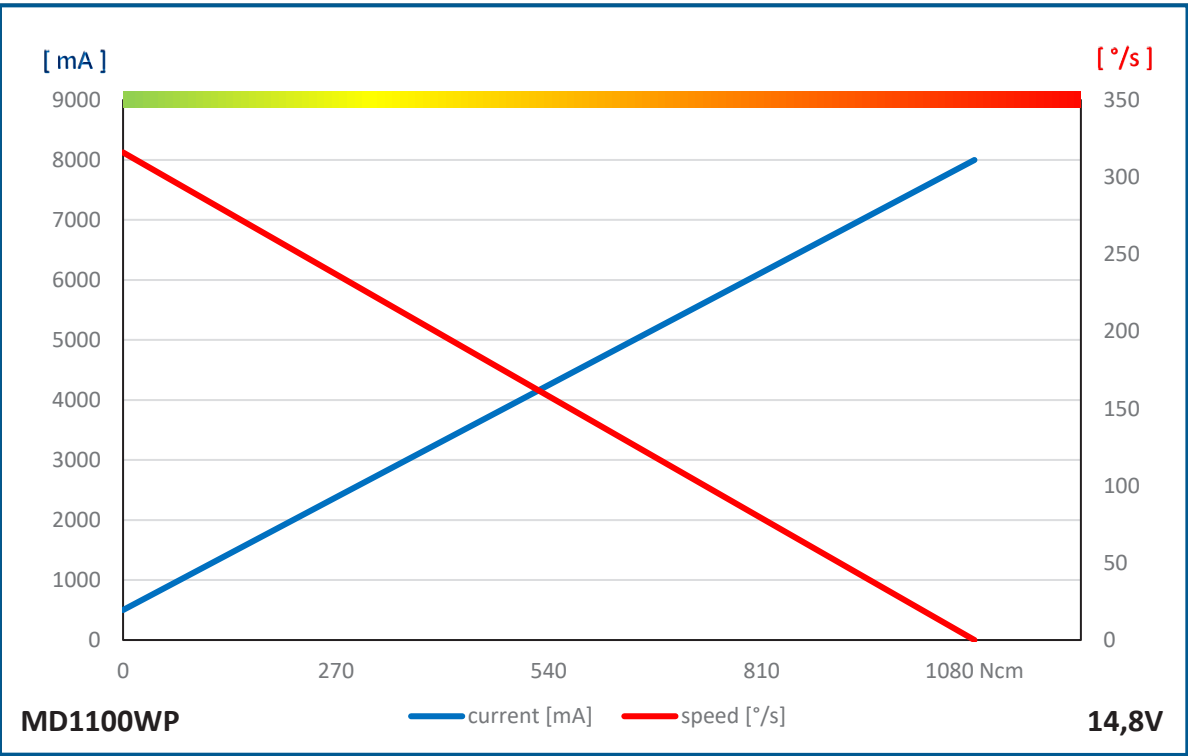
MD1100WP

#1-01638



1:2

PERFORMANCE CHART



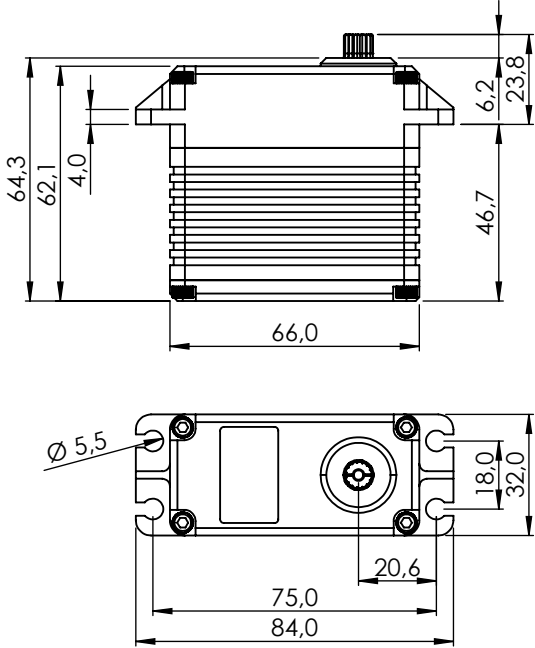
GENERAL SPECIFICATION

| MD1100WP                                     |                                              |                       |
|----------------------------------------------|----------------------------------------------|-----------------------|
| Control System                               | PWM / TTL (Half Duplex)                      |                       |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs     |                       |
| Connector Type                               | Hitec 3P (JR 3P compatible)                  |                       |
| Position Sensor Type                         | Contactless Magnetic Encoder                 |                       |
| Motor Type                                   | 5 Poles DC Cored Carbon Brush                |                       |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive |                       |
| Operating Voltage Range                      | 9.0V ~ 16.8V                                 |                       |
| Operating Voltage                            | At 11.1V                                     | At 14.8V              |
| Operating Speed at no Load                   | 231°/s (38RPM)                               | 316°/s (53RPM)        |
| Stall Torque                                 | 84.0kgcm (824.0Ncm)                          | 110.0kgcm (1079.1Ncm) |
| Peak Efficiency Torque                       | 16.8kgcm (164.8Ncm)                          | 22.0kgcm (215.8Ncm)   |
| Rest Current                                 | 90mA                                         | 90mA                  |
| Running Current at no Load                   | 550mA                                        | 500mA                 |
| Stall Current                                | 6500mA                                       | 8000mA                |
| Deadband Width                               | 2µs                                          | 2µs                   |
| Operating Travel                             | Default                                      | ±60°                  |
|                                              | Programmable                                 | Max. 320°             |
|                                              | Multi Turn/Continuous Rotation               | n/a / n/a             |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                |                       |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                |                       |
| Vibrations at no Load                        | IEC-60068-2-64                               |                       |
| Connector Wire Length                        | 270mm                                        |                       |
| Connector Wire Gauge                         | 18AWG (Signal: 20AWG)                        |                       |
| Connector Wire Strand Count                  | 120/0.08 (80/0.08)                           |                       |
| External Dimensions                          | 64.0 x 33.0 x 73.0mm                         |                       |
| Weight*                                      | 324.3g                                       |                       |
| Ball Bearing                                 | Dual Ball Bearing & Dual Needle Bearing      |                       |
| Case Material                                | Rugged Aluminum Alloy                        |                       |
| Gear Material                                | 1 Metal-Plastic & 3 Hardened Steel Gears     |                       |
| Gear Train Backlash                          | Max. 0.5°                                    |                       |
| Horn Gear Spline                             | 15T Ø8.0                                     |                       |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MO)         |                       |
| IP-Rating                                    | IP67                                         |                       |
| Revision                                     | Rev. 1.1 / 03.01.2024                        |                       |
| Changelog                                    | -                                            |                       |
| *of the servo w/o only horns and accessories |                                              |                       |



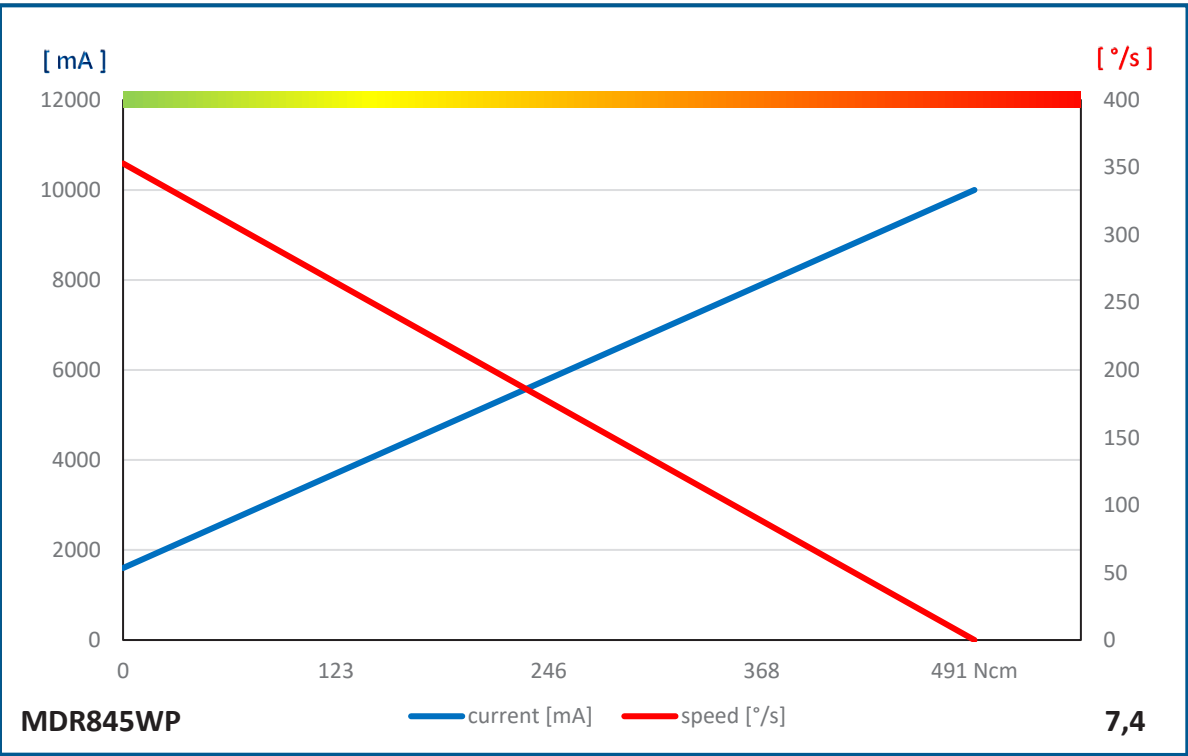
MDR845WP

#1-01329



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PERFORMANCE CHART



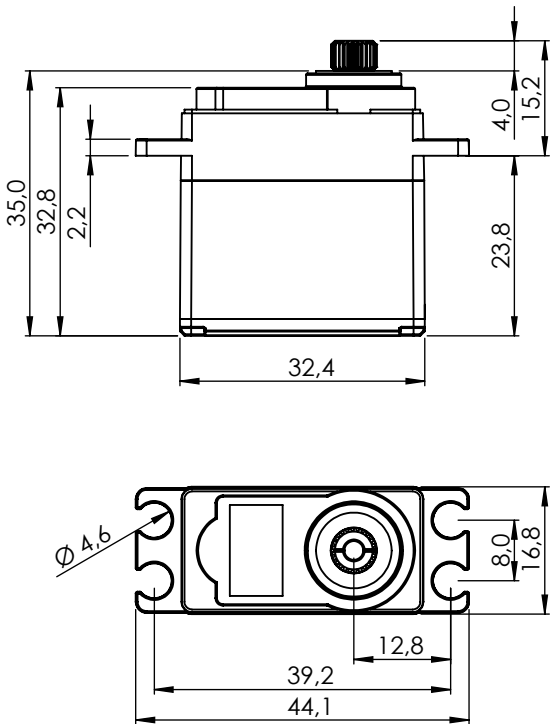
GENERAL SPECIFICATION

| MDR845WP                                     |                                                     |                     |                     |
|----------------------------------------------|-----------------------------------------------------|---------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                             |                     |                     |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs            |                     |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                         |                     |                     |
| Position Sensor Type                         | Contactless Magnetic Encoder                        |                     |                     |
| Motor Type                                   | Cored Carbon Brush                                  |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital                          |                     |                     |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                         |                     |                     |
| Operating Voltage                            | At 4.8V                                             | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 231°/s (38RPM)                                      | 286°/s (48RPM)      | 353°/s (59RPM)      |
| Stall Torque                                 | 32.5kgcm (318.8Ncm)                                 | 40.5kgcm (397.3Ncm) | 50.0kgcm (490.5Ncm) |
| Peak Efficiency Torque                       | 6.5kgcm (63.8Ncm)                                   | 8.1kgcm (79.5Ncm)   | 10.0kgcm (98.1Ncm)  |
| Rest Current                                 | 30mA                                                | 30mA                | 30mA                |
| Running Current at no Load                   | 1100mA                                              | 1250mA              | 1600mA              |
| Stall Current                                | 6000mA                                              | 7000mA              | 10000mA             |
| Deadband Width                               | 2µs                                                 | 2µs                 | 2µs                 |
| Operating Travel                             | Default                                             | ±1800°              |                     |
|                                              | Programmable                                        | Max. ±8 Turns       |                     |
|                                              | Multi Turn/Continuous Rotation                      | Yes / Yes           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                       |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                      |                     |                     |
| Vibrations at no Load                        | -                                                   |                     |                     |
| Connector Wire Length                        | 300mm                                               |                     |                     |
| Connector Wire Gauge                         | 20AWG                                               |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                             |                     |                     |
| External Dimensions                          | 66.0 x 32.0 x 62.1mm                                |                     |                     |
| Weight*                                      | 229.4g                                              |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                   |                     |                     |
| Case Material                                | Engineering Plastic & Aluminum Heatsink             |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 4 Steel Gears                     |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                           |                     |                     |
| Horn Gear Spline                             | 15T Ø8.0                                            |                     |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (Q-MIA, Q-XA, Q-MIA) |                     |                     |
| IP-Rating                                    | IP67                                                |                     |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                               |                     |                     |
| Changelog                                    | -                                                   |                     |                     |
|                                              |                                                     |                     |                     |
| *of the servo only w/o horns and accessories |                                                     |                     |                     |
|                                              |                                                     |                     |                     |



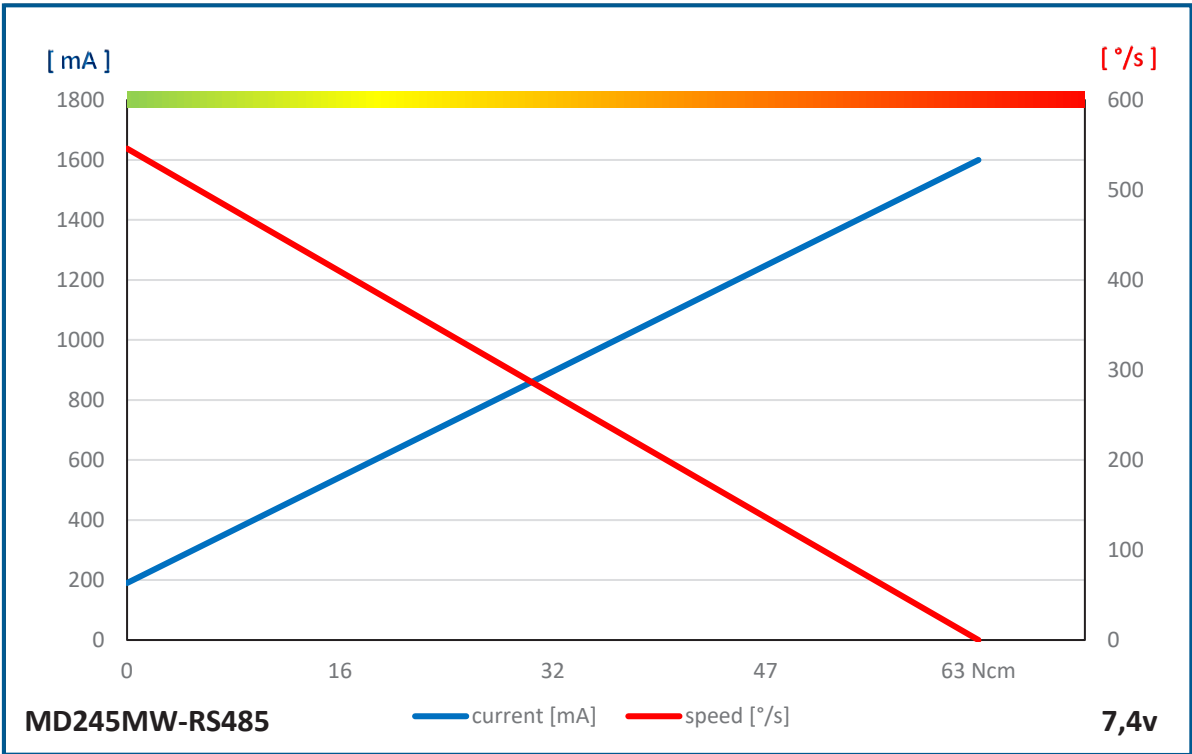
MD245MW-RS485

#1-01677



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PERFORMANCE CHART

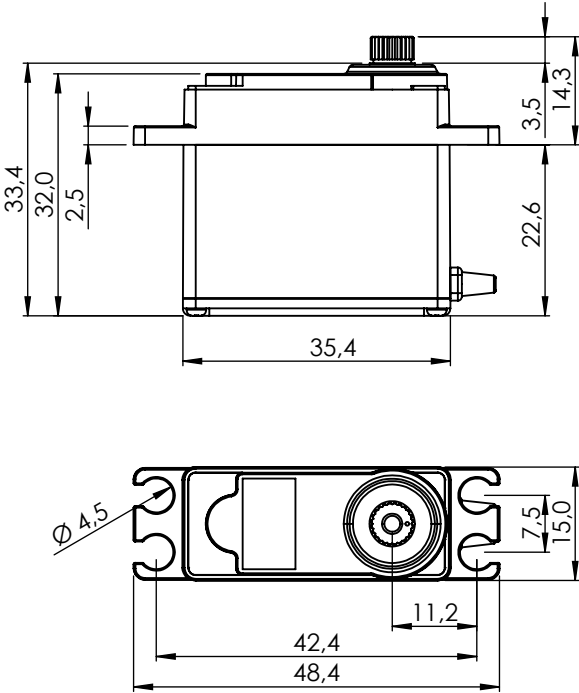


GENERAL SPECIFICATION

| MD245MW-RS485                                |                                       |                   |                   |
|----------------------------------------------|---------------------------------------|-------------------|-------------------|
| Control System                               | RS485                                 |                   |                   |
|                                              | Pulse Width -                         |                   |                   |
| Connector Type                               | Hitec 4P                              |                   |                   |
| Position Sensor Type                         | Contactless Magnetic Encoder          |                   |                   |
| Motor Type                                   | Coreless                              |                   |                   |
| Amplifier / MCU                              | 32bit programmable Digital            |                   |                   |
| Operating Voltage Range                      | 4.0V ~ 8.4V                           |                   |                   |
| Operating Voltage                            | At 4.8V                               | At 6.0V           | At 7.4V           |
| Operating Speed at no Load                   | 353°/s (59RPM)                        | 462°/s (77RPM)    | 546°/s (91RPM)    |
| Stall Torque                                 | 4.2kgcm (41.2Ncm)                     | 5.2kgcm (51.0Ncm) | 6.4kgcm (62.8Ncm) |
| Peak Efficiency Torque                       | 0.9kgcm (8.8Ncm)                      | 1.0kgcm (9.8Ncm)  | 1.3kgcm (12.8Ncm) |
| Rest Current                                 | 30mA                                  | 30mA              | 30mA              |
| Running Current at no Load                   | 110mA                                 | 150mA             | 190mA             |
| Stall Current                                | 1000mA                                | 1300mA            | 1600mA            |
| Deadband Width                               | n/a                                   | n/a               | n/a               |
| Opearting Travel                             | Default                               | ±60°              |                   |
|                                              | Programmable                          | Max. 320°         |                   |
|                                              | Multi Turn/Continuous Rotation        | n/a / n/a         |                   |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)         |                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)         |                   |                   |
| Vibrations at no Load                        | -                                     |                   |                   |
| Connector Wire Length                        | 300mm                                 |                   |                   |
| Connector Wire Gauge                         | 22AWG                                 |                   |                   |
| Connector Wire Strand Count                  | 60/0.08                               |                   |                   |
| External Dimensions                          | 32.4 x 16.8 x 32.8mm                  |                   |                   |
| Weight*                                      | 35.2g                                 |                   |                   |
| Ball Bearing                                 | Dual Ball Bearing                     |                   |                   |
| Case Material                                | Engineering Plastic                   |                   |                   |
| Gear Material                                | 1 Metal-Plastic & 3 Metal Gears       |                   |                   |
| Gear Train Backlash                          | Max. 0.5°                             |                   |                   |
| Horn Gear Spline                             | H25T Ø6.0                             |                   |                   |
| Accessories                                  | Mounting Hardware, Servo Horn (M-O25) |                   |                   |
| IP-Rating                                    | IP4X                                  |                   |                   |
| Revision                                     | Rev. 1.0 / 05.01.2024                 |                   |                   |
| Changelog                                    | -                                     |                   |                   |
|                                              |                                       |                   |                   |
| *of the servo only w/o horns and accessories |                                       |                   |                   |
|                                              |                                       |                   |                   |

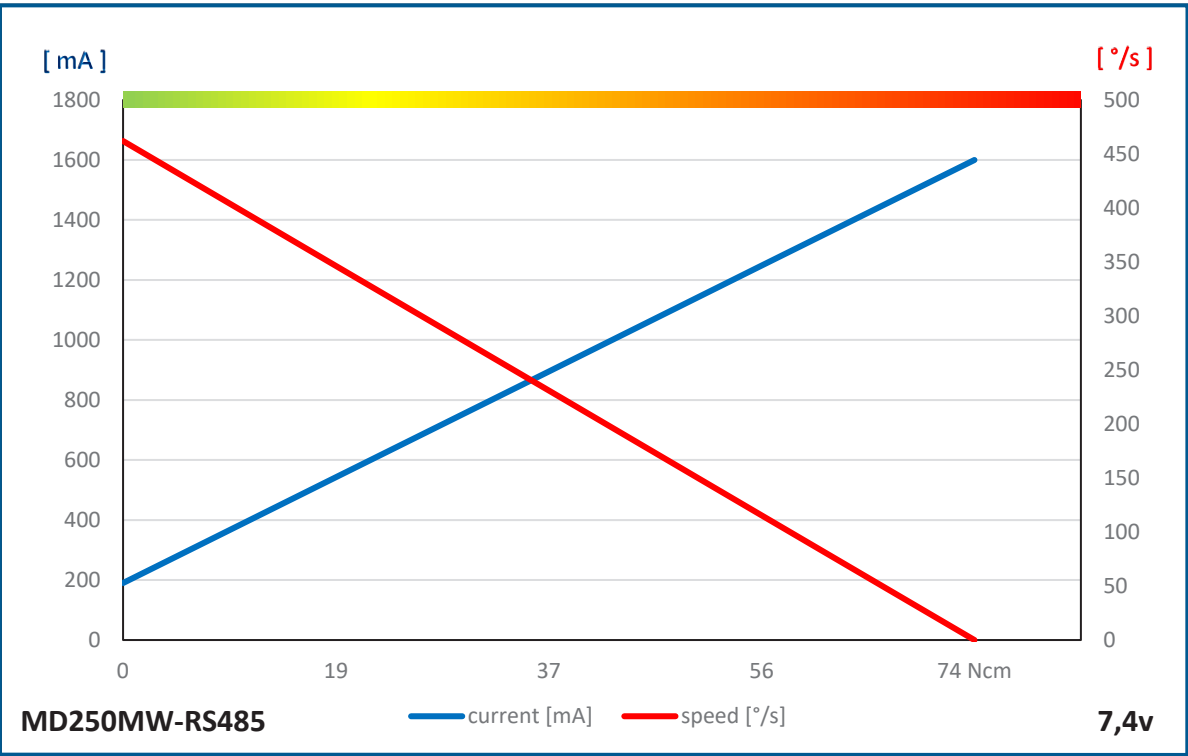
MD250MW-RS485

#1-01676



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PERFORMANCE CHART

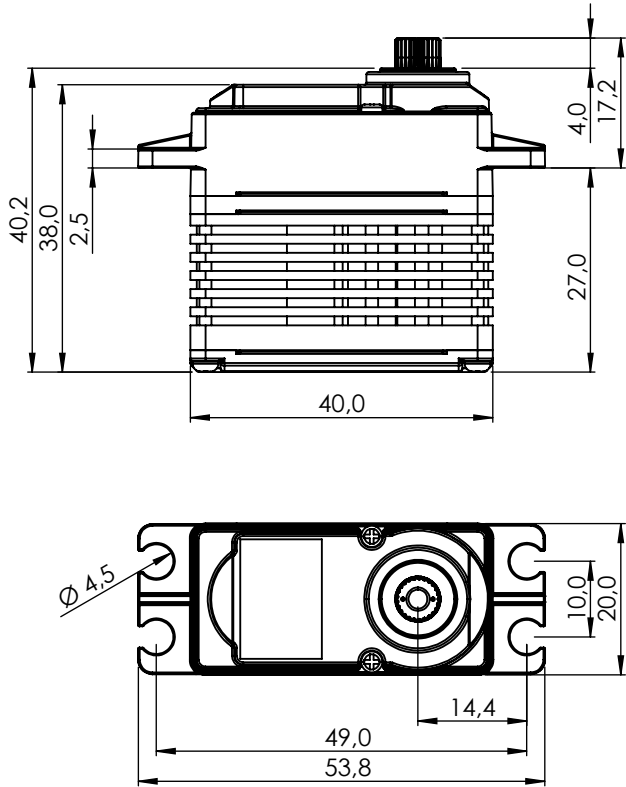


GENERAL SPECIFICATION

| MD250MW-RS485                                |                                       |                   |                   |
|----------------------------------------------|---------------------------------------|-------------------|-------------------|
| Control System                               | RS485                                 |                   |                   |
|                                              | Pulse Width -                         |                   |                   |
| Connector Type                               | Hitec 4P                              |                   |                   |
| Position Sensor Type                         | Contactless Magnetic Encoder          |                   |                   |
| Motor Type                                   | Cored Carbon Brush                    |                   |                   |
| Amplifier / MCU                              | 32bit programmable Digital            |                   |                   |
| Operating Voltage Range                      | 4.0V ~ 8.4V                           |                   |                   |
| Operating Voltage                            | At 4.8V                               | At 6.0V           | At 7.4V           |
| Operating Speed at no Load                   | 300°/s (50RPM)                        | 375°/s (63RPM)    | 462°/s (77RPM)    |
| Stall Torque                                 | 4.9kgcm (48.1Ncm)                     | 6.1kgcm (59.8Ncm) | 7.5kgcm (73.6Ncm) |
| Peak Efficiency Torque                       | 1.0kgcm (9.8Ncm)                      | 1.2kgcm (11.8Ncm) | 1.5kgcm (14.7Ncm) |
| Rest Current                                 | 40mA                                  | 40mA              | 40mA              |
| Running Current at no Load                   | 110mA                                 | 150mA             | 190mA             |
| Stall Current                                | 1000mA                                | 1300mA            | 1600mA            |
| Deadband Width                               | n/a                                   | n/a               | n/a               |
| Opearting Travel                             | Default                               | ±60°              |                   |
|                                              | Programmable                          | Max. 320°         |                   |
|                                              | Multi Turn/Continuous Rotation        | n/a / n/a         |                   |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)         |                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)         |                   |                   |
| Vibrations at no Load                        | -                                     |                   |                   |
| Connector Wire Length                        | 300mm                                 |                   |                   |
| Connector Wire Gauge                         | 22AWG                                 |                   |                   |
| Connector Wire Strand Count                  | 60/0.08                               |                   |                   |
| External Dimensions                          | 35.4 x 15.0 x 32.0mm                  |                   |                   |
| Weight*                                      | 40.0g                                 |                   |                   |
| Ball Bearing                                 | Dual Ball Bearing                     |                   |                   |
| Case Material                                | Engineering Plastic                   |                   |                   |
| Gear Material                                | 1 Metal-Plastic & 4 Steel Gears       |                   |                   |
| Gear Train Backlash                          | Max. 0.5°                             |                   |                   |
| Horn Gear Spline                             | H25T Ø6.0                             |                   |                   |
| Accessories                                  | Mounting Hardware, Servo Horn (M-I25) |                   |                   |
| IP-Rating                                    | IP4X                                  |                   |                   |
| Revision                                     | Rev. 1.0 / 05.01.2024                 |                   |                   |
| Changelog                                    | -                                     |                   |                   |
|                                              |                                       |                   |                   |
| *of the servo only w/o horns and accessories |                                       |                   |                   |
|                                              |                                       |                   |                   |

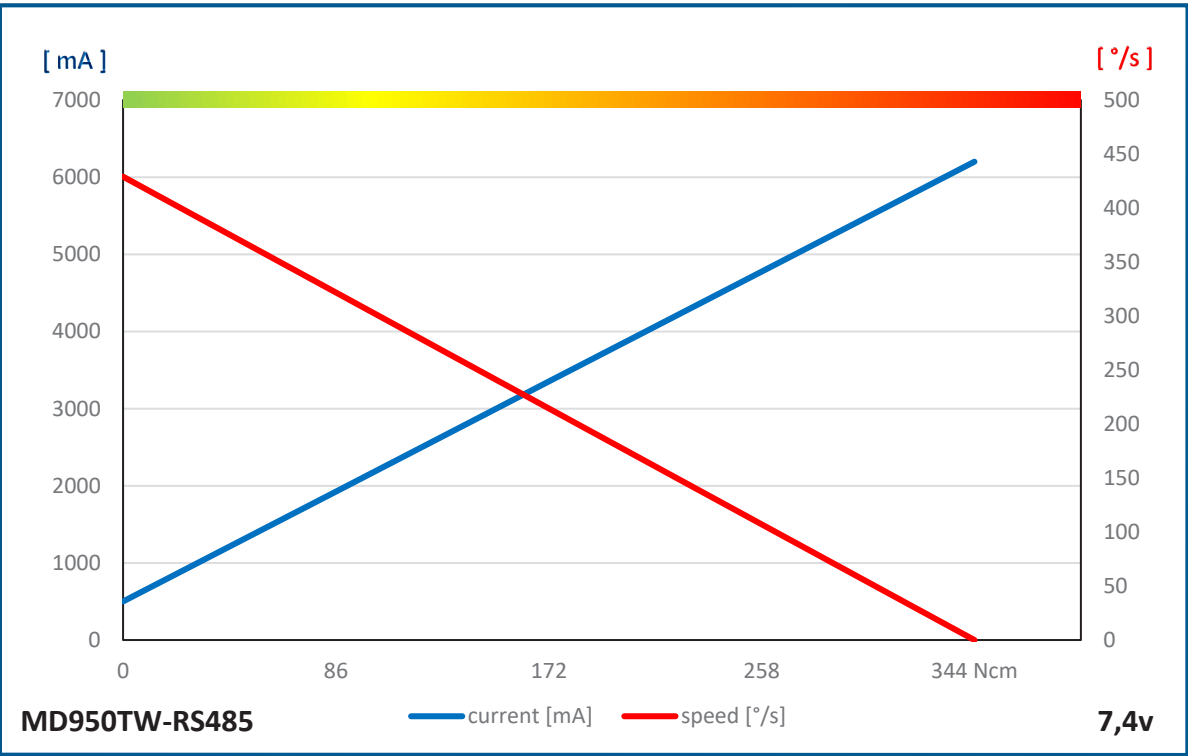
MD950TW-RS485

#1-01675



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PERFORMANCE CHART

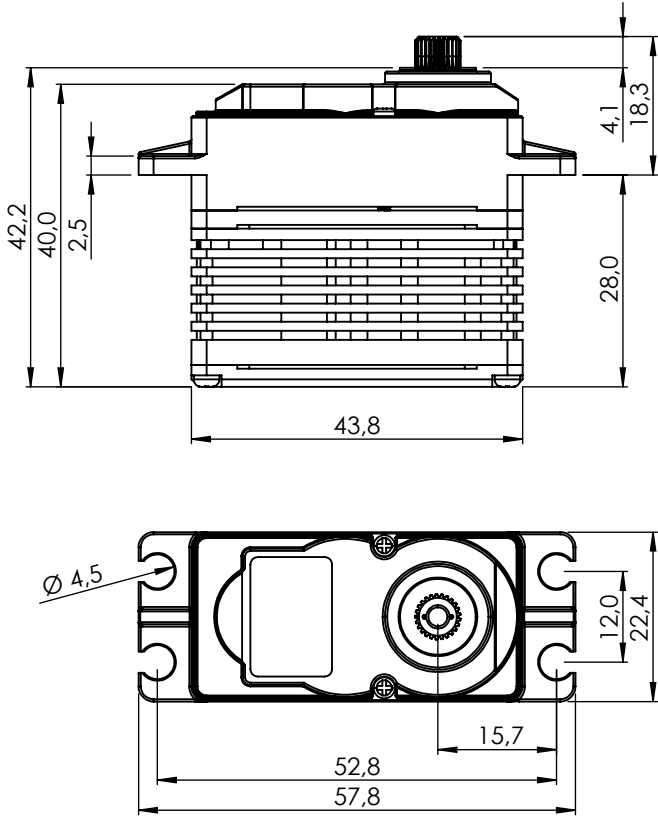


GENERAL SPECIFICATION

| MD950TW-RS485                                |                                                                    |                     |                     |
|----------------------------------------------|--------------------------------------------------------------------|---------------------|---------------------|
| Control System                               | RS485                                                              |                     |                     |
|                                              | Pulse Width   -                                                    |                     |                     |
| Connector Type                               | Hitec 4P                                                           |                     |                     |
| Position Sensor Type                         | Contactless Magnetic Encoder                                       |                     |                     |
| Motor Type                                   | Coreless                                                           |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital                                         |                     |                     |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                                        |                     |                     |
| Operating Voltage                            | At 4.8V                                                            | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 261°/s (44RPM)                                                     | 353°/s (59RPM)      | 429°/s (71RPM)      |
| Stall Torque                                 | 21.0kgcm (206.0Ncm)                                                | 29.0kgcm (284.5Ncm) | 35.0kgcm (343.4Ncm) |
| Peak Efficiency Torque                       | 4.2kgcm (41.2Ncm)                                                  | 5.8kgcm (56.9Ncm)   | 7.0kgcm (68.7Ncm)   |
| Rest Current                                 | 30mA                                                               | 30mA                | 30mA                |
| Running Current at no Load                   | 300mA                                                              | 390mA               | 500mA               |
| Stall Current                                | 3700mA                                                             | 4800mA              | 6200mA              |
| Deadband Width                               | n/a                                                                | n/a                 | n/a                 |
| Opearting Travel                             | Default                                                            | ±60°                |                     |
|                                              | Programmable                                                       | Max. 320°           |                     |
|                                              | Multi Turn/Continuous Rotation                                     | n/a / n/a           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                      |                     |                     |
| Vibrations at no Load                        | -                                                                  |                     |                     |
| Connector Wire Length                        | 300mm                                                              |                     |                     |
| Connector Wire Gauge                         | 20AWG                                                              |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                                            |                     |                     |
| External Dimensions                          | 40.0 x 20.0 x 38.0mm                                               |                     |                     |
| Weight*                                      | 66.3g                                                              |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                     |                     |
| Case Material                                | Engineering plastic & Aluminum Heatsink                            |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Titanium Alloy Gears                           |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                                          |                     |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                     |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |                     |
| IP-Rating                                    | IP54                                                               |                     |                     |
| Revision                                     | Rev. 1.0 / 05.01.2024                                              |                     |                     |
| Changelog                                    | -                                                                  |                     |                     |
|                                              |                                                                    |                     |                     |
| *of the servo only w/o horns and accessories |                                                                    |                     |                     |
|                                              |                                                                    |                     |                     |

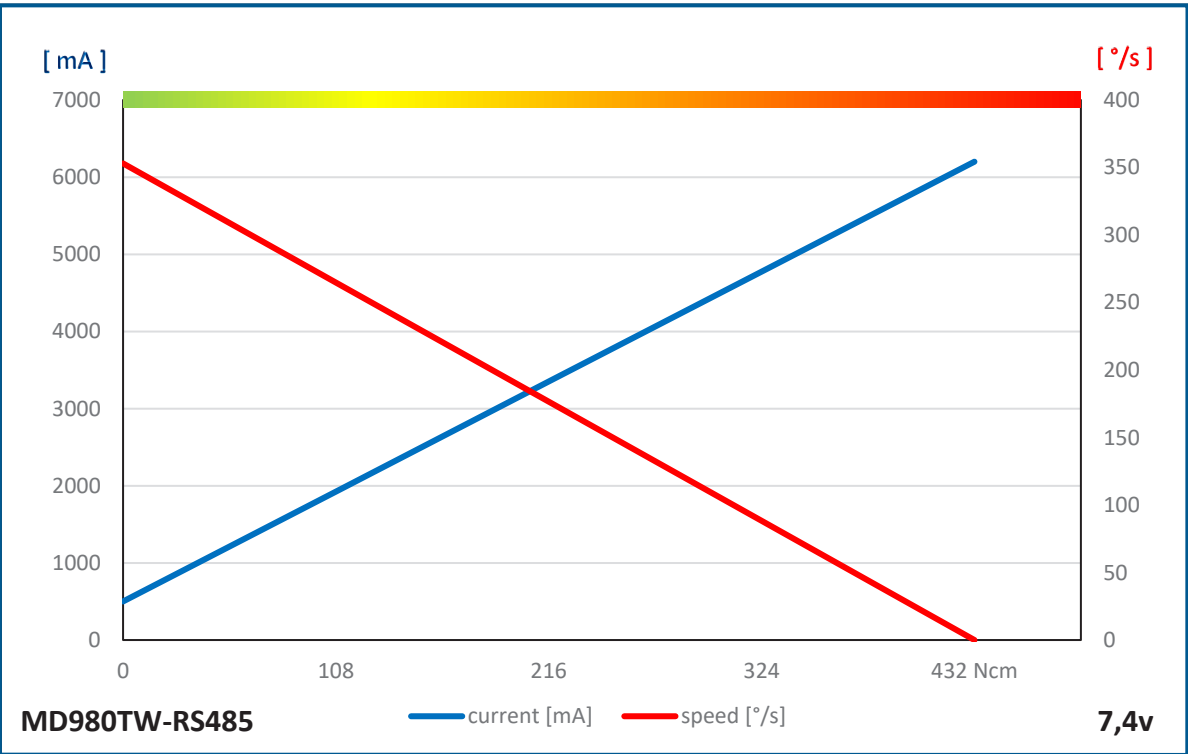
MD980TW-RS485

#1-03230



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PERFORMANCE CHART



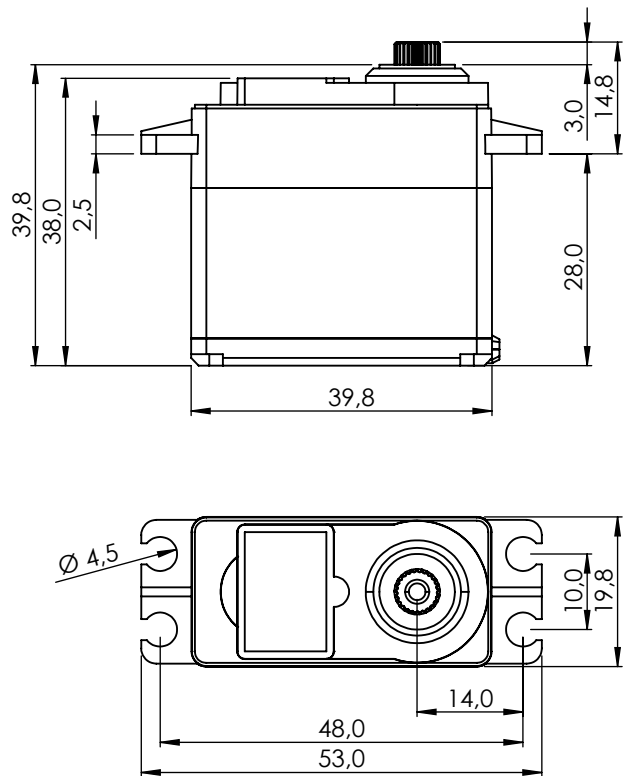
GENERAL SPECIFICATION

| MD980TW-RS485                                |                                                                                                        |                     |                     |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------|---------------------|
| Control System                               | RS485                                                                                                  |                     |                     |
|                                              | Pulse Width   -                                                                                        |                     |                     |
| Connector Type                               | Hitec 4P                                                                                               |                     |                     |
| Position Sensor Type                         | Contactless Magnetic Encoder                                                                           |                     |                     |
| Motor Type                                   | Coreless                                                                                               |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital                                                                             |                     |                     |
| Operating Voltage Range                      | 4.0V ~ 8.4V                                                                                            |                     |                     |
| Operating Voltage                            | At 4.8V                                                                                                | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 214°/s (36RPM)                                                                                         | 286°/s (48RPM)      | 353°/s (59RPM)      |
| Stall Torque                                 | 26.0kgcm (255.1Ncm)                                                                                    | 36.0kgcm (353.2Ncm) | 44.0kgcm (431.6Ncm) |
| Peak Efficiency Torque                       | 5.2kgcm (51.0Ncm)                                                                                      | 7.2kgcm (70.6Ncm)   | 8.8kgcm (86.3Ncm)   |
| Rest Current                                 | 30mA                                                                                                   | 30mA                | 30mA                |
| Running Current at no Load                   | 300mA                                                                                                  | 390mA               | 500mA               |
| Stall Current                                | 4200mA                                                                                                 | 4800mA              | 6200mA              |
| Deadband Width                               | n/a                                                                                                    | n/a                 | n/a                 |
| Opearting Travel                             | Default                                                                                                | ±60°                |                     |
|                                              | Programmable                                                                                           | Max. 320°           |                     |
|                                              | Multi Turn/Continuous Rotation                                                                         | n/a / n/a           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                                                          |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                                                          |                     |                     |
| Vibrations at no Load                        | -                                                                                                      |                     |                     |
| Connector Wire Length                        | 300mm                                                                                                  |                     |                     |
| Connector Wire Gauge                         | 20AWG                                                                                                  |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                                                                                |                     |                     |
| External Dimensions                          | 43.8 x 22.4 x 40.0mm                                                                                   |                     |                     |
| Weight*                                      | 76.7g                                                                                                  |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                                                                      |                     |                     |
| Case Material                                | Engineering plastic                                                                                    |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Titanium Alloy Gears                                                               |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                                                                              |                     |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                                                              |                     |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25, HD-IG25, HD-LG25) |                     |                     |
| IP-Rating                                    | IP54                                                                                                   |                     |                     |
| Revision                                     | Rev. 1.0 / 08.01.2024                                                                                  |                     |                     |
| Changelog                                    | -                                                                                                      |                     |                     |
|                                              |                                                                                                        |                     |                     |
| *of the servo only w/o horns and accessories |                                                                                                        |                     |                     |
|                                              |                                                                                                        |                     |                     |



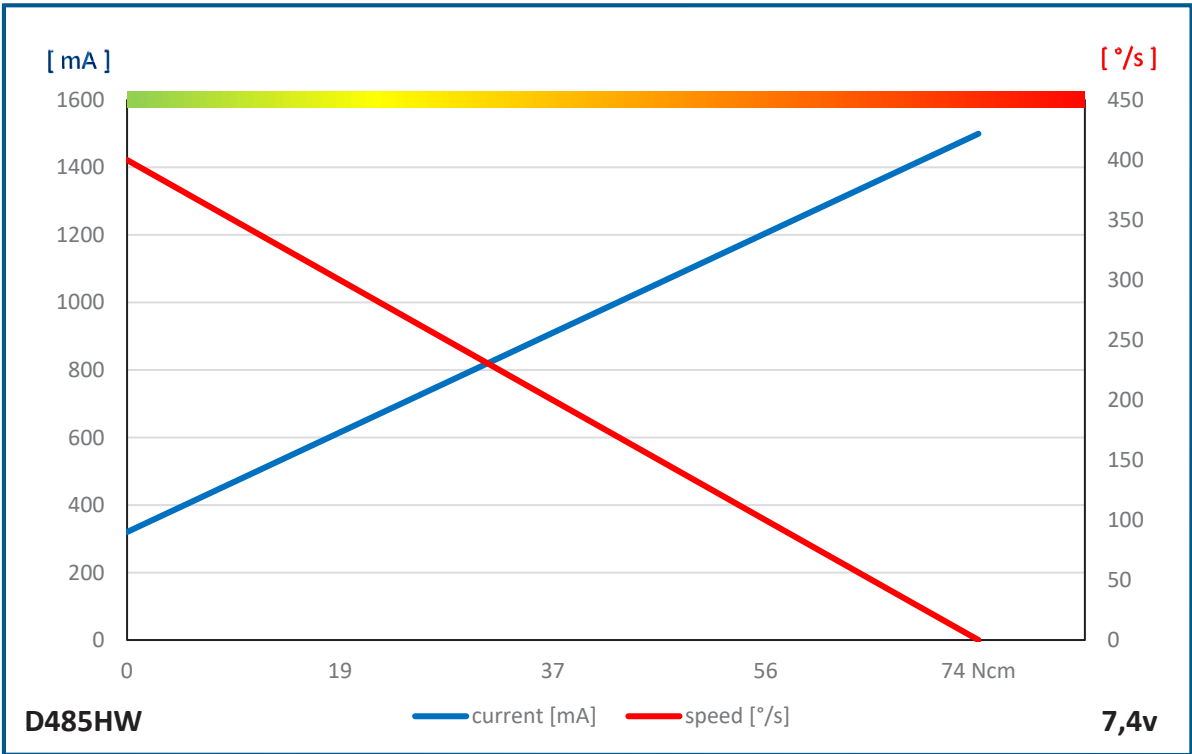
D485HW

#1-00066  
#1-02362 GP 30 Stück



1:1

PERFORMANCE CHART



GENERAL SPECIFICATION

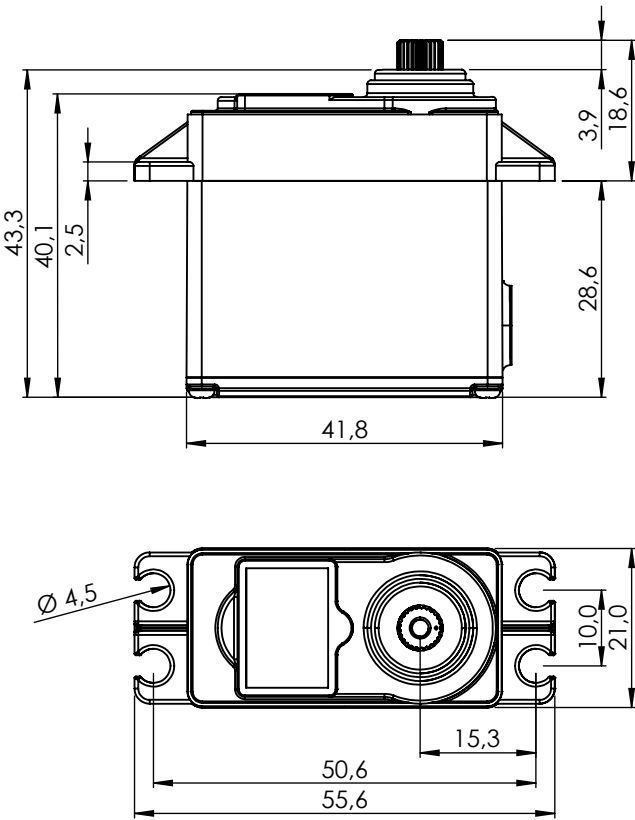
| D485HW                                       |                                                                    |                   |                   |
|----------------------------------------------|--------------------------------------------------------------------|-------------------|-------------------|
| Control System                               | PWM / TTL (Half Duplex)                                            |                   |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                           |                   |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                        |                   |                   |
| Position Sensor Type                         | Indirect Drive / 1M Cycle Long Life                                |                   |                   |
| Motor Type                                   | Cored Metal Brush                                                  |                   |                   |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive                       |                   |                   |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                                        |                   |                   |
| Operating Voltage                            | At 4.8V                                                            | At 6.0V           | At 7.4V           |
| Operating Speed at no Load                   | 300°/s (50RPM)                                                     | 353°/s (59RPM)    | 400°/s (67RPM)    |
| Stall Torque                                 | 5.2kgcm (51.0Ncm)                                                  | 6.4kgcm (62.8Ncm) | 7.5kgcm (73.6Ncm) |
| Peak Efficiency Torque                       | 1.0kgcm (9.8Ncm)                                                   | 1.3kgcm (12.8Ncm) | 1.5kgcm (14.7Ncm) |
| Rest Current                                 | 30mA                                                               | 30mA              | 30mA              |
| Running Current at no Load                   | 250mA                                                              | 280mA             | 320mA             |
| Stall Current                                | 1000mA                                                             | 1200mA            | 1500mA            |
| Deadband Width                               | 2µs                                                                | 2µs               | 2µs               |
| Operating Travel                             | Default                                                            | ±60°              |                   |
|                                              | Programmable                                                       | Max. 175°         |                   |
|                                              | Multi Turn/Continuous Rotation                                     | n/a / n/a         |                   |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                      |                   |                   |
| Vibrations at no Load                        | -                                                                  |                   |                   |
| Connector Wire Length                        | 300mm                                                              |                   |                   |
| Connector Wire Gauge                         | 24AWG                                                              |                   |                   |
| Connector Wire Strand Count                  | 40/0.08                                                            |                   |                   |
| External Dimensions                          | 39.8 x 19.8 x 38.0mm                                               |                   |                   |
| Weight*                                      | 45.0g                                                              |                   |                   |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                   |                   |
| Case Material                                | Engineering Plastic                                                |                   |                   |
| Gear Material                                | 4 Heavy Duty Resin Gears                                           |                   |                   |
| Gear Train Backlash                          | Max. 0.5°                                                          |                   |                   |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                   |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                   |                   |
| IP-Rating                                    | IP54                                                               |                   |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                                              |                   |                   |
| Changelog                                    | -                                                                  |                   |                   |
|                                              |                                                                    |                   |                   |
| *of the servo only w/o horns and accessories |                                                                    |                   |                   |



D646WP

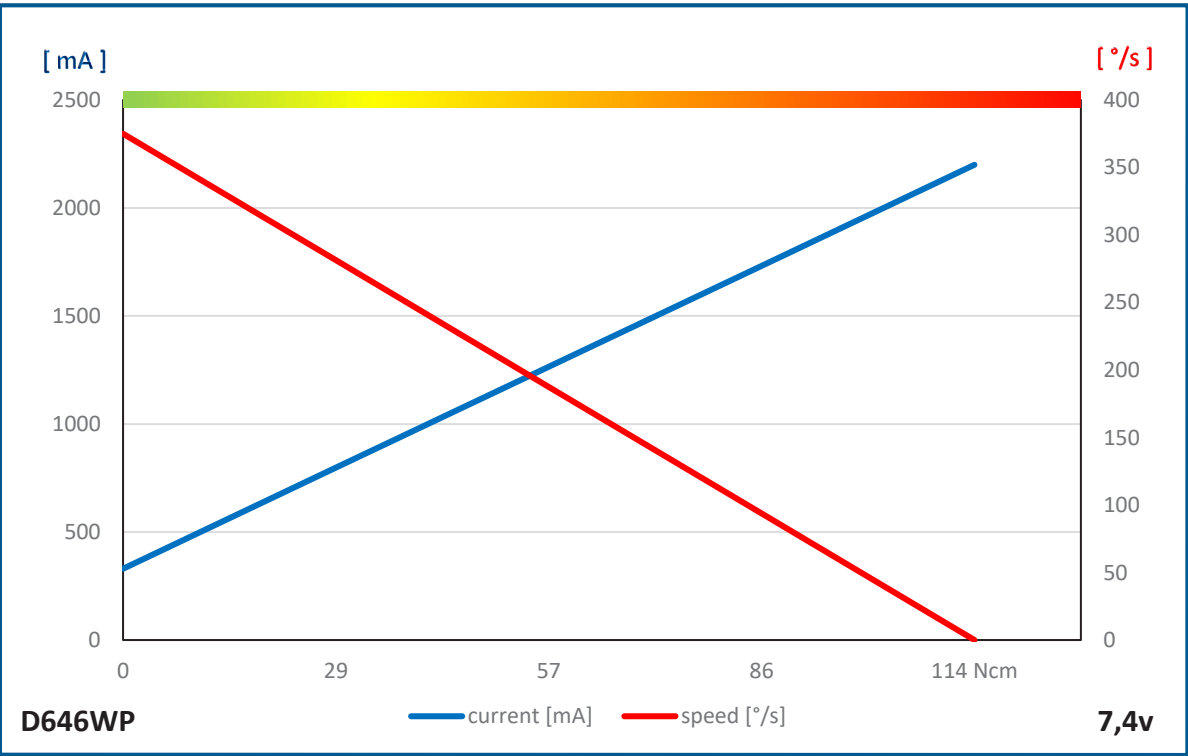
#1-00072

#1-02354 GP 24 Stück



1:1

PERFORMANCE CHART

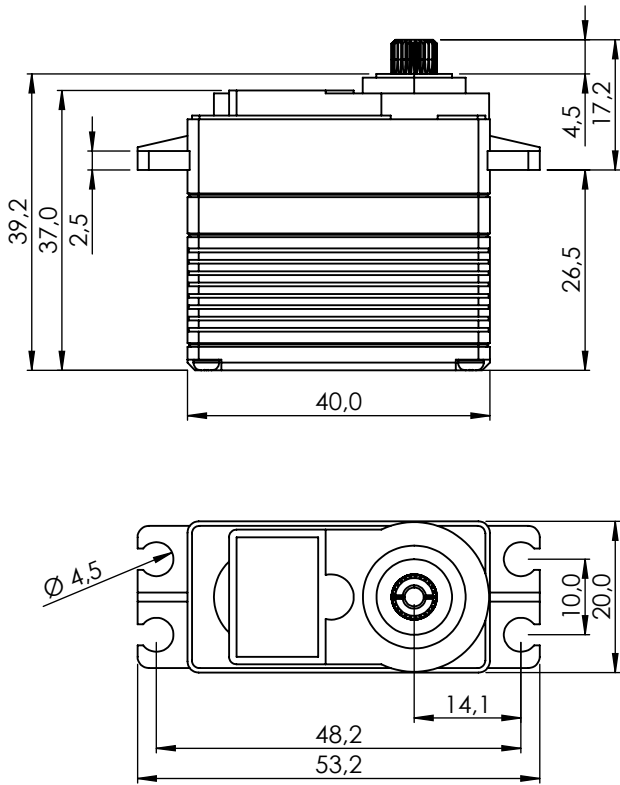


GENERAL SPECIFICATION

| D646WP                                       |                                                                    |                   |                     |
|----------------------------------------------|--------------------------------------------------------------------|-------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                                            |                   |                     |
|                                              | Pulse Width    900µs 1500µs (Center) 2100µs                        |                   |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                        |                   |                     |
| Position Sensor Type                         | Contact Analog / 4 Slider / 1M Cycle Long Life                     |                   |                     |
| Motor Type                                   | Cored Carbon Brush                                                 |                   |                     |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive                       |                   |                     |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                                        |                   |                     |
| Operating Voltage                            | At 4.8V                                                            | At 6.0V           | At 7.4V             |
| Operating Speed at no Load                   | 250°/s (42RPM)                                                     | 316°/s (33RPM)    | 375°/s (63RPM)      |
| Stall Torque                                 | 7.5kgcm (73.6Ncm)                                                  | 9.6kgcm (94.2Ncm) | 11.6kgcm (113.8Ncm) |
| Peak Efficiency Torque                       | 1.5kgcm (14.7Ncm)                                                  | 1.9kgcm (18.6Ncm) | 2.3kgcm (22.6Ncm)   |
| Rest Current                                 | 30mA                                                               | 30mA              | 30mA                |
| Running Current at no Load                   | 270mA                                                              | 300mA             | 330mA               |
| Stall Current                                | 1500mA                                                             | 1800mA            | 2200mA              |
| Deadband Width                               | 2µs                                                                | 2µs               | 2µs                 |
| Operating Travel                             | Default                                                            | ±60°              |                     |
|                                              | Programmable                                                       | Max. 170°         |                     |
|                                              | Multi Turn/Continuous Rotation                                     | n/a / n/a         |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                   |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                      |                   |                     |
| Vibrations at no Load                        | -                                                                  |                   |                     |
| Connector Wire Length                        | 300mm                                                              |                   |                     |
| Connector Wire Gauge                         | 22AWG                                                              |                   |                     |
| Connector Wire Strand Count                  | 60/0.08                                                            |                   |                     |
| External Dimensions                          | 41.8 x 21.0 x 40.1mm                                               |                   |                     |
| Weight*                                      | 61.0g                                                              |                   |                     |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                   |                     |
| Case Material                                | Engineering Plastic                                                |                   |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Metal Gears                                    |                   |                     |
| Gear Train Backlash                          | Max. 0.5°                                                          |                   |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                   |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                   |                     |
| IP-Rating                                    | IP67                                                               |                   |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                              |                   |                     |
| Changelog                                    | -                                                                  |                   |                     |
|                                              |                                                                    |                   |                     |
| *of the servo only w/o horns and accessories |                                                                    |                   |                     |

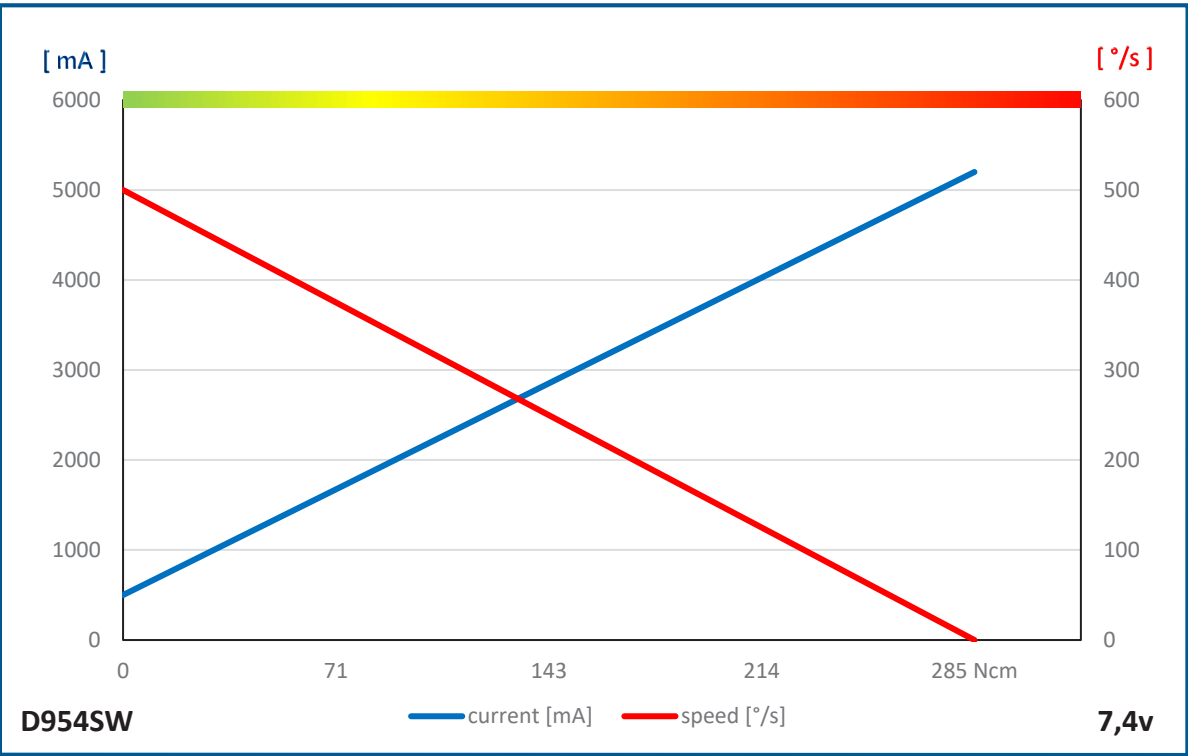
D954SW

#116954



1:1

PERFORMANCE CHART

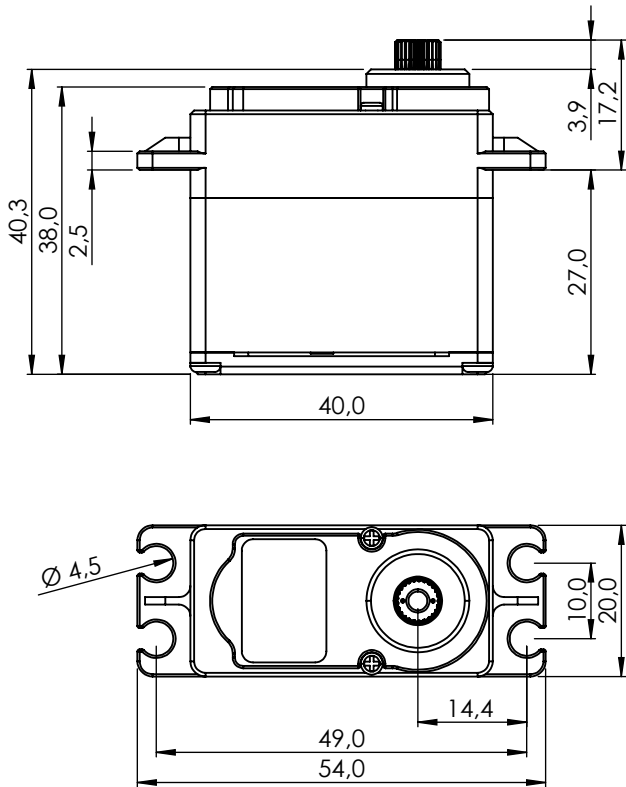


GENERAL SPECIFICATION

| D954SW                                       |                                                                    |                     |                     |
|----------------------------------------------|--------------------------------------------------------------------|---------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                                            |                     |                     |
|                                              | Pules Width 900µs 1500µs (Center) 2100µs                           |                     |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                        |                     |                     |
| Position Sensor Type                         | Indirect Drive / 1M Cycle Long Life                                |                     |                     |
| Motor Type                                   | Coreless                                                           |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive                       |                     |                     |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                                        |                     |                     |
| Operating Voltage                            | At 4.8V                                                            | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 316°/s (53RPM)                                                     | 400°/s (67RPM)      | 500°/s (83RPM)      |
| Stall Torque                                 | 16.0kgcm (157.0Ncm)                                                | 24.0kgcm (235.4Ncm) | 29.0kgcm (284.5Ncm) |
| Peak Efficiency Torque                       | 3.6kgcm (35.3Ncm)                                                  | 4.8kgcm (47.1Ncm)   | 5.8kgcm (56.9Ncm)   |
| Rest Current                                 | 30mA                                                               | 30mA                | 30mA                |
| Running Current at no Load                   | 300mA                                                              | 400mA               | 500mA               |
| Stall Current                                | 3200mA                                                             | 4200mA              | 5200mA              |
| Deadband Width                               | 1µs                                                                | 1µs                 | 1µs                 |
| Operating Travel                             | Default                                                            | ±60° **             |                     |
|                                              | Programmable                                                       | Max. 175°           |                     |
|                                              | Multi Turn/Continuous Rotation                                     | n/a / n/a           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                      |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                      |                     |                     |
| Vibrations at no Load                        | -                                                                  |                     |                     |
| Connector Wire Length                        | 300mm                                                              |                     |                     |
| Connector Wire Gauge                         | 20AWG                                                              |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                                            |                     |                     |
| External Dimensions                          | 40.0 x 20.0 x 37.0mm                                               |                     |                     |
| Weight*                                      | 66.0g                                                              |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                                  |                     |                     |
| Case Material                                | Engineering Plastic & Aluminum Heatsink                            |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Steel Gears                                    |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                                          |                     |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                          |                     |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25) |                     |                     |
| IP-Rating                                    | IP54                                                               |                     |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                              |                     |                     |
| Changelog                                    | -                                                                  |                     |                     |
|                                              |                                                                    |                     |                     |
| *of the servo only w/o horns and accessories |                                                                    |                     |                     |
| ** also available with 270°                  |                                                                    |                     |                     |

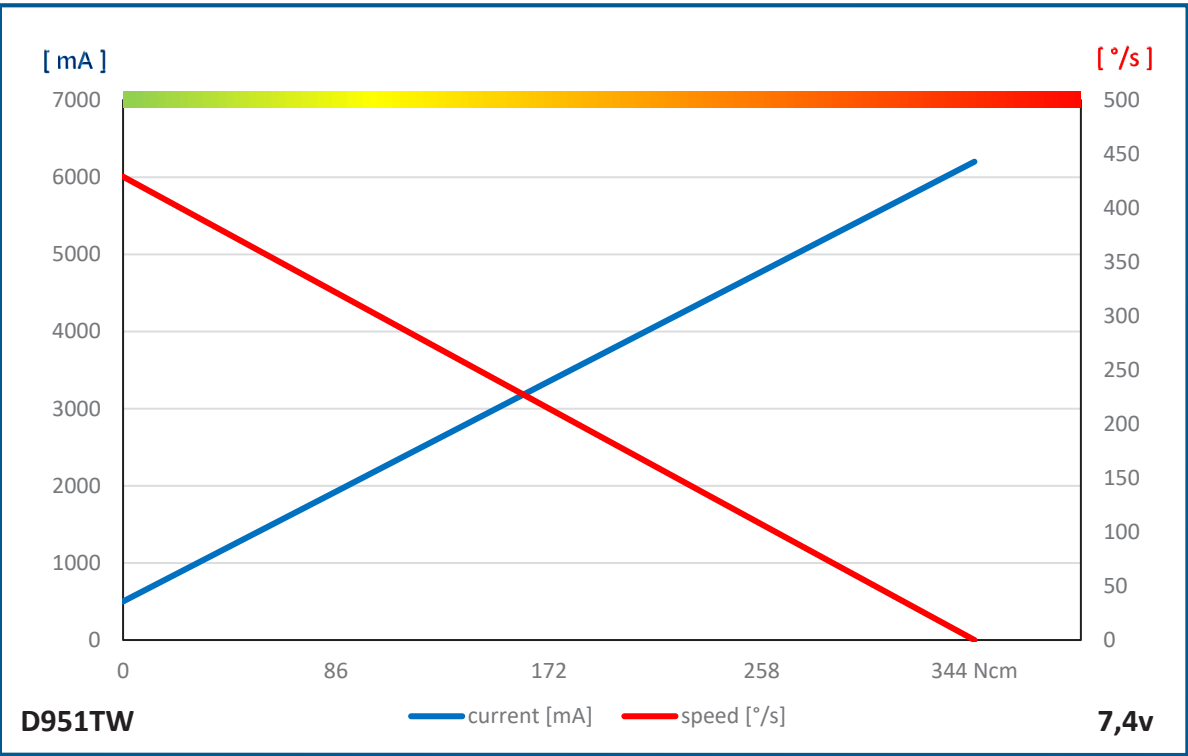
D951TW

#116951  
#1-02359 GP 24 Stück



1:1

PERFORMANCE CHART

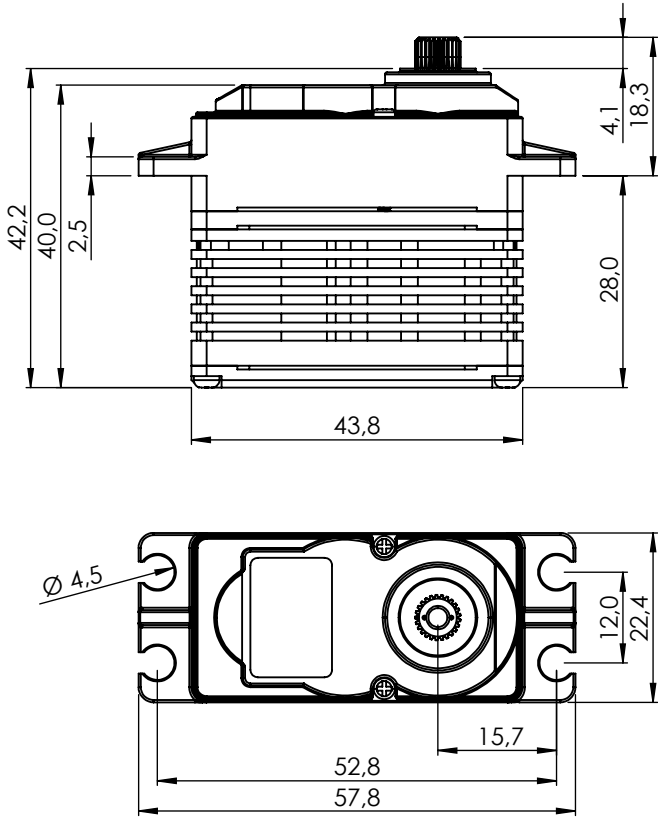


GENERAL SPECIFICATION

| D951TW                                       |                                                      |                     |                     |
|----------------------------------------------|------------------------------------------------------|---------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                              |                     |                     |
|                                              | PWM Range 900µs   1500µs   2100µs                    |                     |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                          |                     |                     |
| Position Sensor Type                         | Indirect Drive / 1M Cycle Long Life                  |                     |                     |
| Motor Type                                   | Coreless                                             |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive         |                     |                     |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                          |                     |                     |
| Operating Voltage                            | At 4.8V                                              | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 261°/s (44RPM)                                       | 353°/s (59RPM)      | 429°/s (71RPM)      |
| Stall Torque                                 | 21.0kgcm (206.0Ncm)                                  | 29.0kgcm (284.5Ncm) | 35.0kgcm (343.4Ncm) |
| Peak Efficiency Torque                       | 4.2kgcm (41.2Ncm)                                    | 5.8kgcm (56.9Ncm)   | 7.0kgcm (68.7Ncm)   |
| Rest Current                                 | 30mA                                                 | 30mA                | 30mA                |
| Running Current at no Load                   | 300mA                                                | 390mA               | 500mA               |
| Stall Current                                | 3700mA                                               | 4800mA              | 6200mA              |
| Deadband Width                               | 1µs                                                  | 1µs                 | 1µs                 |
| Operating Travel                             | Default                                              | ±60°                |                     |
|                                              | Programmable                                         | Max. 175°           |                     |
|                                              | Multi Turn/Continuous Rotation                       | n/a / n/a           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                        |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                        |                     |                     |
| Vibrations at no Load                        | -                                                    |                     |                     |
| Connector Wire Length                        | 300mm                                                |                     |                     |
| Connector Wire Gauge                         | 20AWG                                                |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                              |                     |                     |
| External Dimensions                          | 40.0 x 20.0 x 38.0mm                                 |                     |                     |
| Weight*                                      | 80.0g                                                |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                    |                     |                     |
| Case Material                                | Aluminum Alloy                                       |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Titanium Alloy Gears             |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                            |                     |                     |
| Horn Gear Spline                             | H25T Ø6.0                                            |                     |                     |
| Accessories                                  | Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25 |                     |                     |
| IP-Rating                                    | IP54                                                 |                     |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                |                     |                     |
| Changelog                                    | -                                                    |                     |                     |
|                                              |                                                      |                     |                     |
| *of the servo only w/o horns and accessories |                                                      |                     |                     |
|                                              |                                                      |                     |                     |

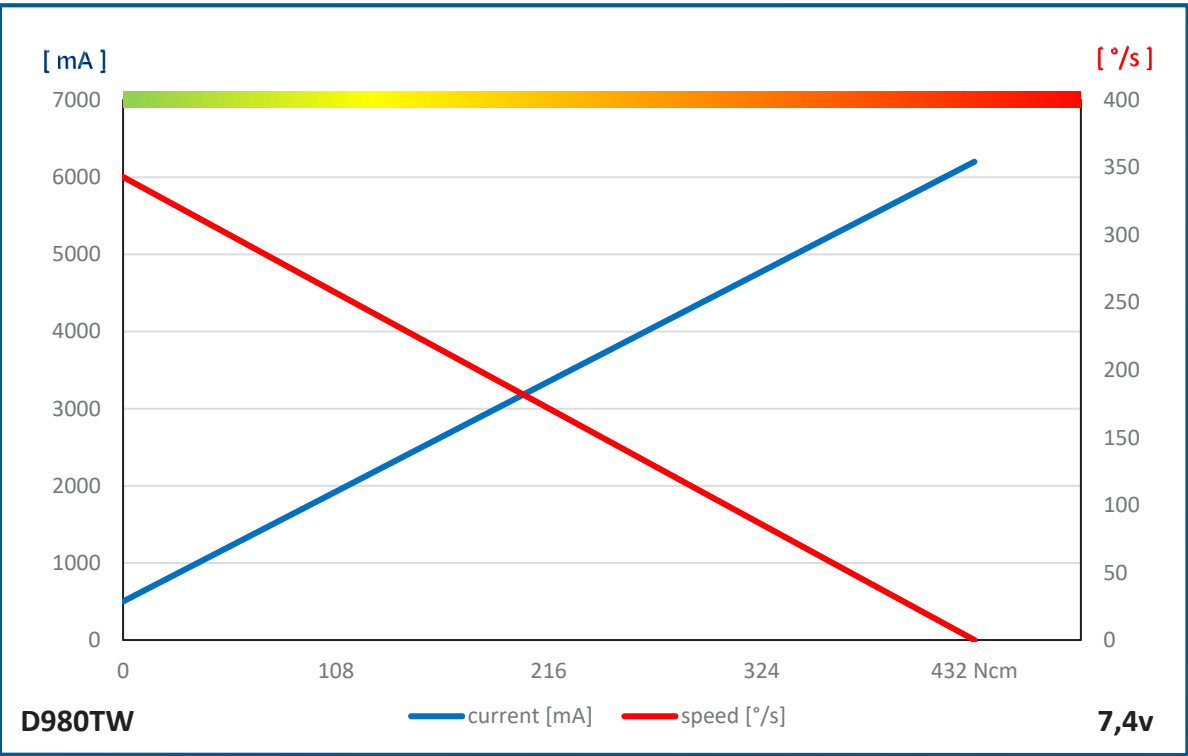
D980TW

#1-02982



1:1

PERFORMANCE CHART



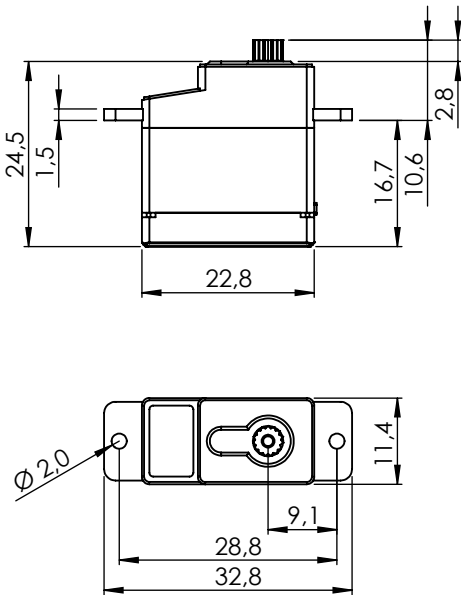
GENERAL SPECIFICATION

| D980TW                                       |                                                                                                        |                     |                     |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------|---------------------|
| Control System                               | PWM / TTL (Half Duplex)                                                                                |                     |                     |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                                                               |                     |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                                                            |                     |                     |
| Position Sensor Type                         | Indirect Drive / 4 Slider / 1M Cylce Long Life                                                         |                     |                     |
| Motor Type                                   | Coreless                                                                                               |                     |                     |
| Amplifier / MCU                              | 32bit programmable Digital with Mosfet Drive                                                           |                     |                     |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                                                                            |                     |                     |
| Operating Voltage                            | At 4.8V                                                                                                | At 6.0V             | At 7.4V             |
| Operating Speed at no Load                   | 214°/s (36RPM)                                                                                         | 286°/s (48RPM)      | 343°/s (59RPM)      |
| Stall Torque                                 | 26.0kgcm (255.1Ncm)                                                                                    | 36.0kgcm (353.2Ncm) | 44.0kgcm (431.6Ncm) |
| Peak Efficiency Torque                       | 5.5kgcm (54.0Ncm)                                                                                      | 7.2kgcm (70.6Ncm)   | 8.8kgcm (86.3Ncm)   |
| Rest Current                                 | 30mA                                                                                                   | 30mA                | 30mA                |
| Running Current at no Load                   | 300mA                                                                                                  | 390mA               | 500mA               |
| Stall Current                                | 4200mA                                                                                                 | 4800mA              | 6200mA              |
| Deadband Width                               | 1µs                                                                                                    | 1µs                 | 1µs                 |
| Opearting Travel                             | Default                                                                                                | ±60°                |                     |
|                                              | Programmable                                                                                           | Max. 175°           |                     |
|                                              | Multi Turn/Continuous Rotation                                                                         | n/a / n/a           |                     |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                                                          |                     |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                                                          |                     |                     |
| Vibrations at no Load                        | -                                                                                                      |                     |                     |
| Connector Wire Length                        | 300mm                                                                                                  |                     |                     |
| Connector Wire Gauge                         | 20AWG                                                                                                  |                     |                     |
| Connector Wire Strand Count                  | 80/0.08                                                                                                |                     |                     |
| External Dimensions                          | 43.8 x 22.4 x 40.0mm                                                                                   |                     |                     |
| Weight*                                      | 78.2g                                                                                                  |                     |                     |
| Ball Bearing                                 | Dual Ball Bearing                                                                                      |                     |                     |
| Case Material                                | Engineering Plastic & Aluminum Heatsink                                                                |                     |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Titanium Alloy Gears                                                               |                     |                     |
| Gear Train Backlash                          | Max. 0.5°                                                                                              |                     |                     |
| Horn Gear Spline                             | H25T Ø6.0                                                                                              |                     |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25, HD-IG25, HD-LG25) |                     |                     |
| IP-Rating                                    | IP54                                                                                                   |                     |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                                                                  |                     |                     |
| Changelog                                    | -                                                                                                      |                     |                     |
|                                              |                                                                                                        |                     |                     |
| *of the servo only w/o horns and accessories |                                                                                                        |                     |                     |



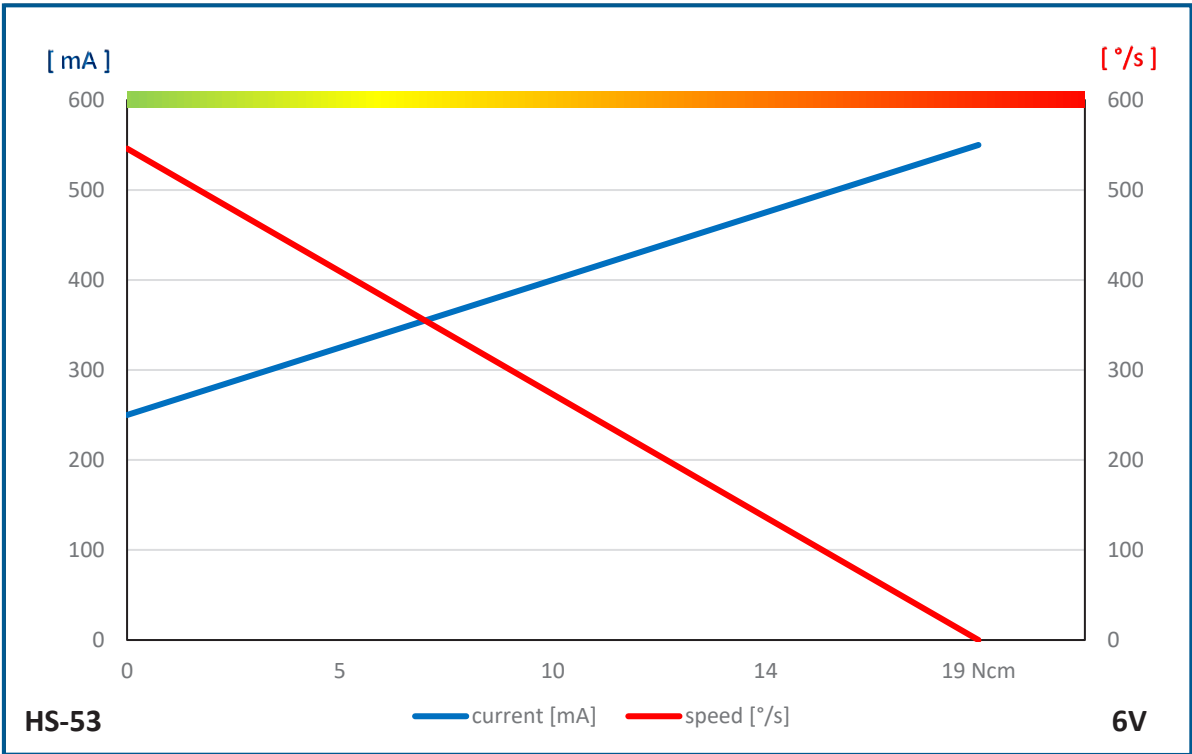
HS-53

#112053  
#112054 GP 20 Stück



1:1

PERFORMANCE CHART



GENERAL SPECIFICATION

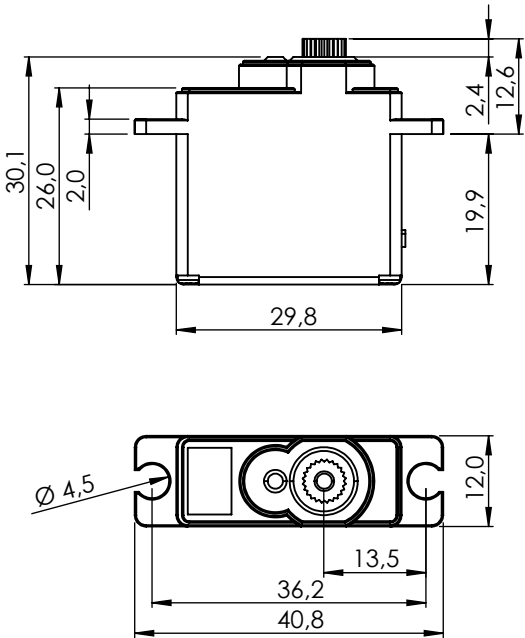
| HS-53                                        |                                          |                   |
|----------------------------------------------|------------------------------------------|-------------------|
| Control System                               | PWM                                      |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)              |                   |
| Position Sensor Type                         | Direct Drive / 2 Slider                  |                   |
| Motor Type                                   | Cored Metal Brush                        |                   |
| Amplifier / MCU                              | Analog                                   |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                              |                   |
| Operating Voltage                            | At 4.8V                                  | At 6.0V           |
| Operating Speed at no Load                   | 429°/s (71RPM)                           | 546°/s (91RPM)    |
| Stall Torque                                 | 1.5kgcm (14.7Ncm)                        | 1.9kgcm (18.6Ncm) |
| Peak Efficiency Torque                       | 0.3kgcm (2.9Ncm)                         | 0.4kgcm (3.9Ncm)  |
| Rest Current                                 | 8mA                                      | 10mA              |
| Running Current at no Load                   | 200mA                                    | 250mA             |
| Stall Current                                | 440mA                                    | 550mA             |
| Deadband Width                               | 5µs                                      | 5µs               |
| Operating Travel                             | Default                                  | ±60°              |
|                                              | Programmable                             | n/a               |
|                                              | Multi Turn/Continuous Rotation           | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)            |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)            |                   |
| Vibrations at no Load                        | -                                        |                   |
| Connector Wire Length                        | 250mm                                    |                   |
| Connector Wire Gauge                         | 28AWG                                    |                   |
| Connector Wire Strand Count                  | 20/0.08                                  |                   |
| External Dimensions                          | 22.8 x 11.4 x 24.5mm                     |                   |
| Weight*                                      | 8.0g                                     |                   |
| Ball Bearing                                 | n/a                                      |                   |
| Case Material                                | Engineering Plastic                      |                   |
| Gear Material                                | 5 Resin Gears                            |                   |
| Gear Train Backlash                          | Max. 0.5°                                |                   |
| Horn Gear Spline                             | 15T Ø4.0                                 |                   |
| Accessories                                  | Tapping Screw, Servo Horns (FS-IL, FS-X) |                   |
| IP-Rating                                    | IP4X                                     |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                    |                   |
| Changelog                                    | -                                        |                   |
| *of the servo only w/o horns and accessories |                                          |                   |



HS-81

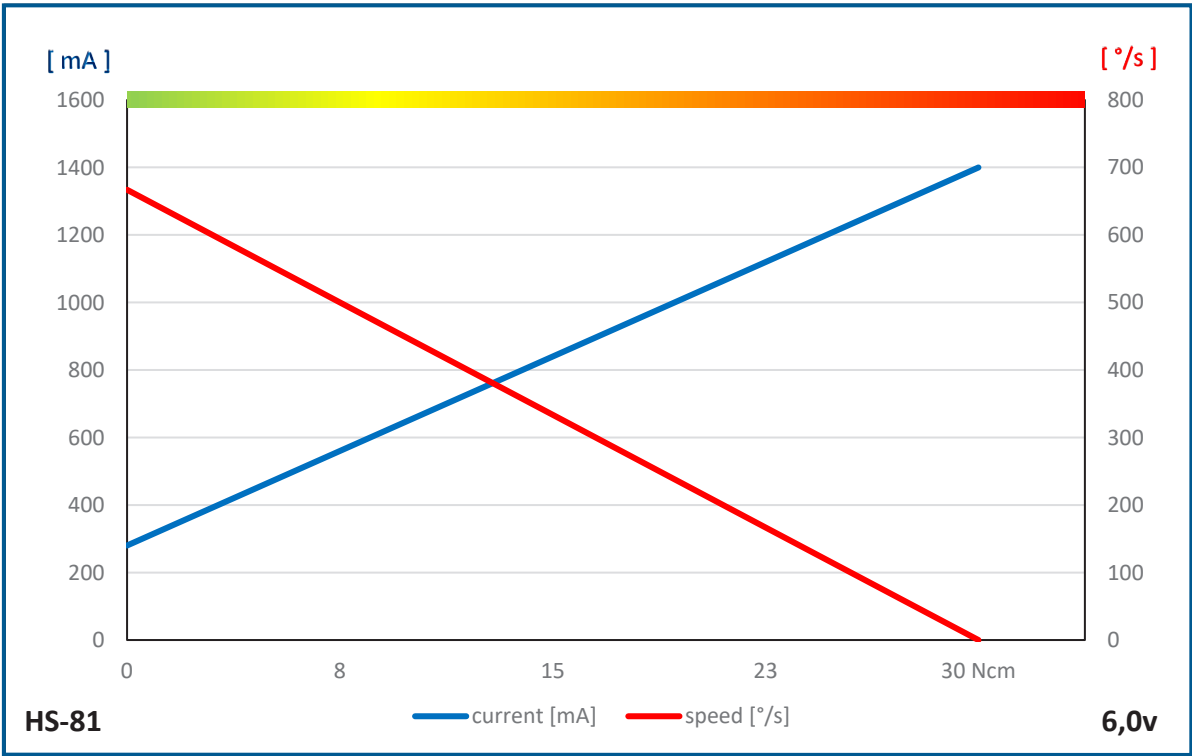
#112081

#112084 GP 20 Stück



1:2

PERFORMANCE CHART

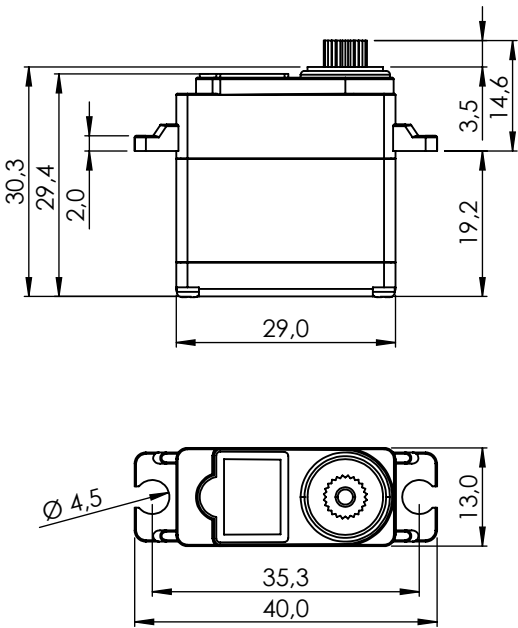


GENERAL SPECIFICATION

| HS-81                                        |                                                |                   |
|----------------------------------------------|------------------------------------------------|-------------------|
| Control System                               | Pulse Width Modulation (PWM)                   |                   |
|                                              | PWM Range '900µs   1500µs   2100µs             |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                    |                   |
| Position Sensor Type                         | Direct Drive                                   |                   |
| Motor Type                                   | Cored / 3 poles Ferrite Motor                  |                   |
| Amplifier / MCU                              | Analog                                         |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                    |                   |
| Operating Voltage                            | At 4.8V                                        | At 6.0V           |
| Operating Speed at no Load                   | 546°/s (91RPM)                                 | 667°/s (111RPM)   |
| Stall Torque                                 | 2.6kgcm (25.5Ncm)                              | 3.0kgcm (29.4Ncm) |
| Peak Efficiency Torque                       | 0.5kgcm (4.9Ncm)                               | 0.6kgcm (5.9Ncm)  |
| Rest Current                                 | 9mA                                            | 9mA               |
| Running Current at no Load                   | 220mA                                          | 280mA             |
| Stall Current                                | -                                              | -                 |
| Deadband Width                               | 5µs                                            | 5µs               |
| Operating Travel                             | Default                                        | ±60°              |
|                                              | Programmable                                   | n/a               |
|                                              | Multi Turn/Continuous Rotation                 | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                  |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                  |                   |
| Vibrations at no Load                        | -                                              |                   |
| Connector Wire Length                        | 250mm                                          |                   |
| Connector Wire Gauge                         | 28AWG                                          |                   |
| Connector Wire Strand Count                  | 20/0.08                                        |                   |
| External Dimensions                          | 29.8 x 12.0 x 26.0mm                           |                   |
| Weight*                                      | 16.6g                                          |                   |
| Ball Bearing                                 | n/a                                            |                   |
| Case Material                                | Engineering Plastic                            |                   |
| Gear Material                                | 3 resin & 1 Heavy Duty Resin Gears             |                   |
| Gear Train Backlash                          | n/a                                            |                   |
| Horn Gear Spline                             | 24T Ø5.76                                      |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I, M-X, M-O) |                   |
| IP-Rating                                    | IP4X                                           |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                          |                   |
| Changelog                                    | -                                              |                   |
|                                              |                                                |                   |
| *of the servo only w/o horns and accessories |                                                |                   |

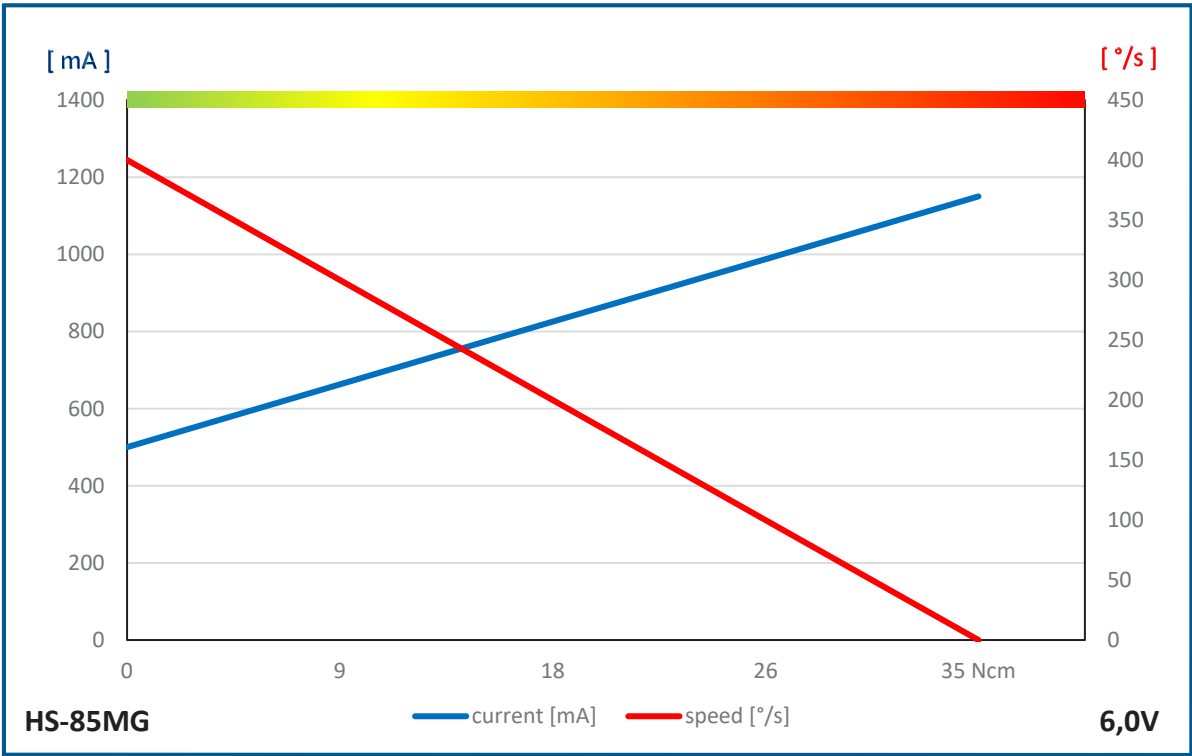
HS-85MG

#112086  
#112091 GP 20 Stück



1:1

PERFORMANCE CHART

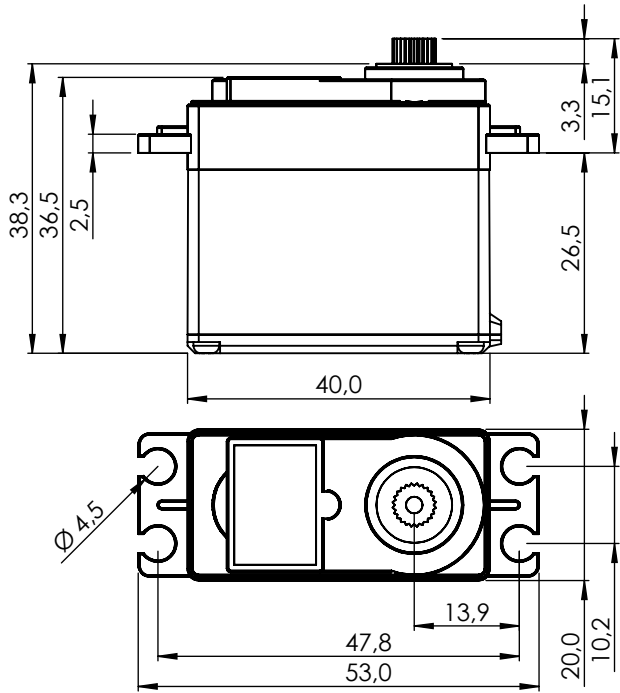


GENERAL SPECIFICATION

| HS-85MG                                      |                                                |                   |
|----------------------------------------------|------------------------------------------------|-------------------|
| Control System                               | PWM                                            |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs       |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                    |                   |
| Position Sensor Type                         | Contact Analog Potentiometer                   |                   |
| Motor Type                                   | Cored / 3 Pole Ferrite Motor                   |                   |
| Amplifier / MCU                              | Analog                                         |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                    |                   |
| Operating Voltage                            | At 4.8V                                        | At 6.0V           |
| Operating Speed at no Load                   | 375°/s (63RPM)                                 | 429°/s (71RPM)    |
| Stall Torque                                 | 3.0kgcm (29.4Ncm)                              | 3.5kgcm (34.3Ncm) |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                               | 0.7kgcm (6.9Ncm)  |
| Rest Current                                 | 8mA                                            | 8mA               |
| Running Current at no Load                   | 240mA                                          | 240mA             |
| Stall Current                                | -                                              | -                 |
| Deadband Width                               | 5µs                                            | 5µs               |
| Operating Travel                             | Default                                        | ±60°              |
|                                              | Programmable                                   | n/a               |
|                                              | Multi Turn/Continuous Rotation                 | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                  |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                  |                   |
| Vibrations at no Load                        | -                                              |                   |
| Connector Wire Length                        | 250mm                                          |                   |
| Connector Wire Gauge                         | 28AWG                                          |                   |
| Connector Wire Strand Count                  | 20/0.08                                        |                   |
| External Dimensions                          | 29.0 x 13.0 x 29.4mm                           |                   |
| Weight*                                      | 21.9g                                          |                   |
| Ball Bearing                                 | Single Ball Bearing                            |                   |
| Case Material                                | Engineering Plastic                            |                   |
| Gear Material                                | 1 Resin & 4 Metal Gears                        |                   |
| Gear Train Backlash                          | Max. 0.5°                                      |                   |
| Horn Gear Spline                             | 24T Ø6.0                                       |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (M-I, M-X, M-O) |                   |
| IP-Rating                                    | IP4X                                           |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                          |                   |
| Changelog                                    | -                                              |                   |
|                                              |                                                |                   |
| *of the servo only w/o horns and accessories |                                                |                   |

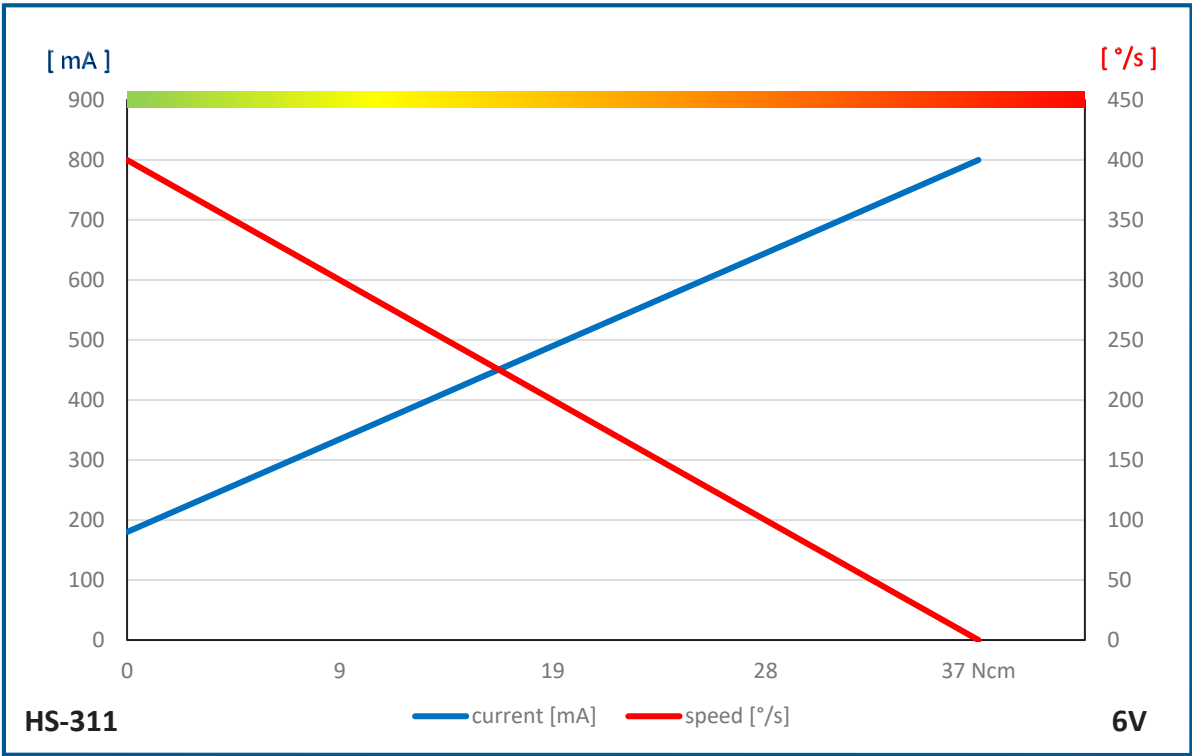
HS-311

#112311  
#IND-112314 GP 30 Stück



1:1

PERFORMANCE CHART

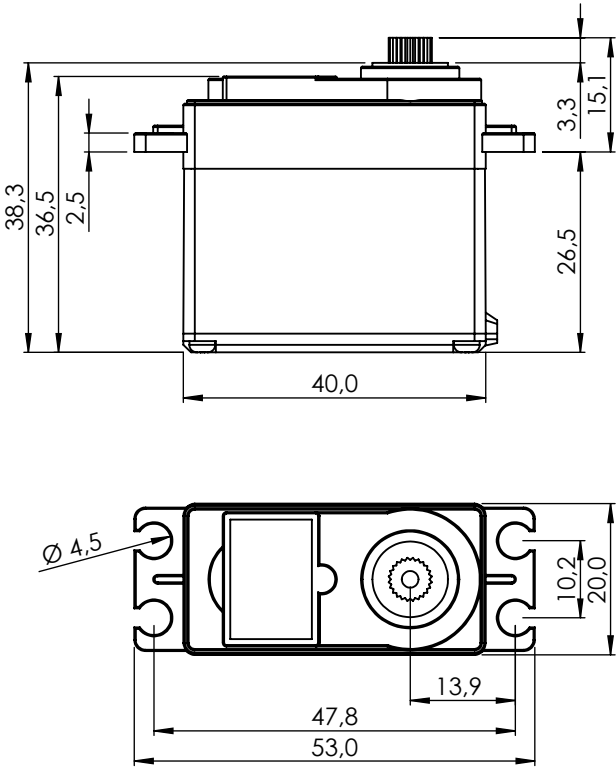


GENERAL SPECIFICATION

| HS-311                                       |                                                                |                   |
|----------------------------------------------|----------------------------------------------------------------|-------------------|
| Control System                               | PWM                                                            |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                       |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                    |                   |
| Position Sensor Type                         | Direct Drive / 4 Slider                                        |                   |
| Motor Type                                   | Cored Metal Brush                                              |                   |
| Amplifier / MCU                              | Analog                                                         |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                                    |                   |
| Operating Voltage                            | At 4.8V                                                        | At 6.0V           |
| Operating Speed at no Load                   | 316°/s (53RPM)                                                 | 400°/s (67RPM)    |
| Stall Torque                                 | 3.0kgcm (29.4Ncm)                                              | 3.7kgcm (36.3Ncm) |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                                               | 0.7kgcm (6.9Ncm)  |
| Rest Current                                 | 7mA                                                            | 8mA               |
| Running Current at no Load                   | 160mA                                                          | 180mA             |
| Stall Current                                | 700mA                                                          | 800mA             |
| Deadband Width                               | 5µs                                                            | 5µs               |
| Operating Travel                             | Default                                                        | ±60°              |
|                                              | Programmable                                                   | n/a               |
|                                              | Multi Turn/Continuous Rotation                                 | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                  |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                  |                   |
| Vibrations at no Load                        | -                                                              |                   |
| Connector Wire Length                        | 300mm                                                          |                   |
| Connector Wire Gauge                         | 24AWG                                                          |                   |
| Connector Wire Strand Count                  | 40/0.08                                                        |                   |
| External Dimensions                          | 40.0 x 20.0 x 36.5mm                                           |                   |
| Weight*                                      | 43.0g                                                          |                   |
| Ball Bearing                                 | Single Resin Bushing                                           |                   |
| Case Material                                | Engineering Plastic                                            |                   |
| Gear Material                                | 4 Resin Gears                                                  |                   |
| Gear Train Backlash                          | Max. 0.5°                                                      |                   |
| Horn Gear Spline                             | 24T Ø6.0                                                       |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (R-O, R-X, R-I, R-D, R-C, R-XA) |                   |
| IP-Rating                                    | IP4X                                                           |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                                          |                   |
| Changelog                                    | -                                                              |                   |
|                                              |                                                                |                   |
| *of the servo only w/o horns and accessories |                                                                |                   |

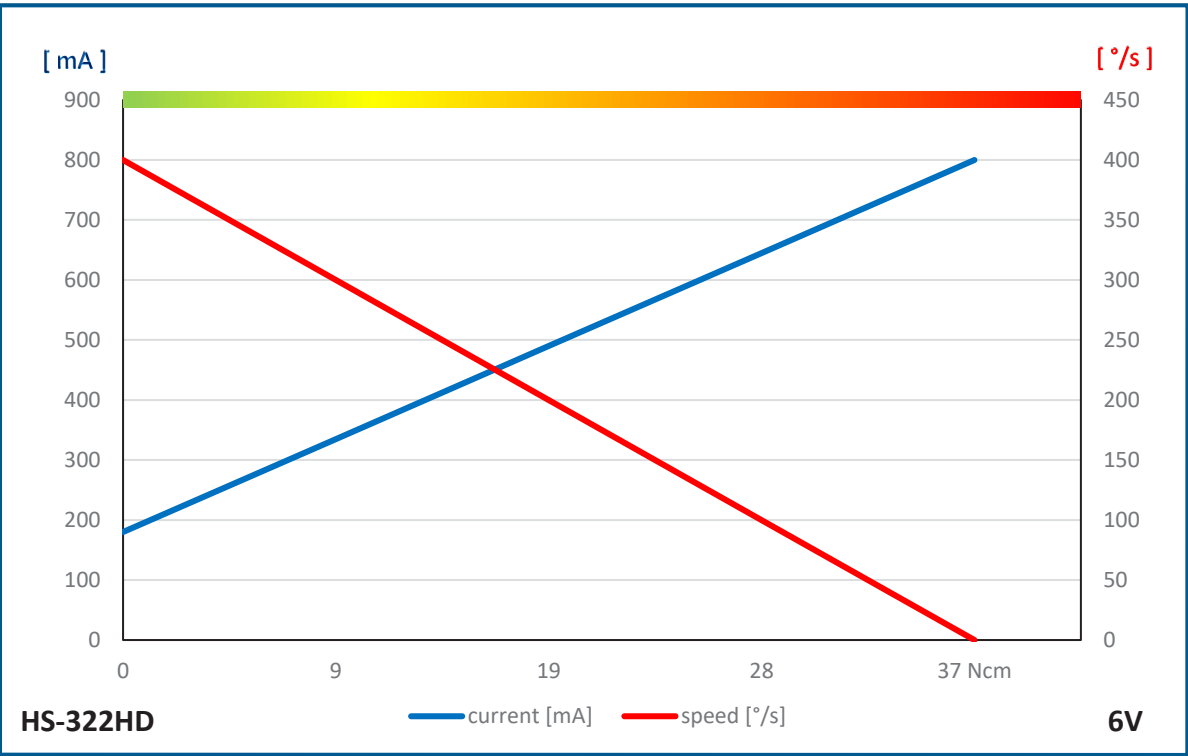
HS-322HD

#112322  
#112326 GP 30 Stück



1:1

PERFORMANCE CHART



GENERAL SPECIFICATION

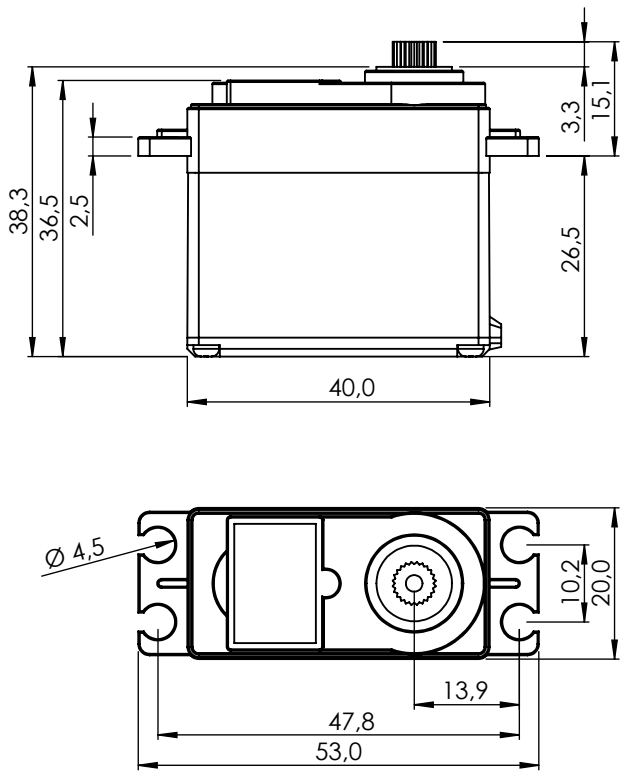
| HS-322HD                                     |                                                          |                   |
|----------------------------------------------|----------------------------------------------------------|-------------------|
| Control System                               | PWM                                                      |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                 |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                              |                   |
| Position Sensor Type                         | Direct Drive / 4 Slider                                  |                   |
| Motor Type                                   | Cored Metal Brush                                        |                   |
| Amplifier / MCU                              | Analog                                                   |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                              |                   |
| Operating Voltage                            | At 4.8V                                                  | At 6.0V           |
| Operating Speed at no Load                   | 316°/s (53RPM)                                           | 400°/s (67RPM)    |
| Stall Torque                                 | 3.0kgcm (29.4Ncm)                                        | 3.7kgcm (36.3Ncm) |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                                         | 0.7kgcm (6.9Ncm)  |
| Rest Current                                 | 7mA                                                      | 8mA               |
| Running Current at no Load                   | 160mA                                                    | 180mA             |
| Stall Current                                | 700mA                                                    | 800mA             |
| Deadband Width                               | 5µs                                                      | 5µs               |
| Operating Travel                             | Default                                                  | ±60°              |
|                                              | Programmable                                             | n/a               |
|                                              | Multi Turn/Continuous Rotation                           | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                            |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                            |                   |
| Vibrations at no Load                        | -                                                        |                   |
| Connector Wire Length                        | 300mm                                                    |                   |
| Connector Wire Gauge                         | 24AWG                                                    |                   |
| Connector Wire Strand Count                  | 40/0.08                                                  |                   |
| External Dimensions                          | 40.0 x 20.0 x 36.5mm                                     |                   |
| Weight*                                      | 43.0g                                                    |                   |
| Ball Bearing                                 | Dual Resin Bushing                                       |                   |
| Case Material                                | Engineering Plastic                                      |                   |
| Gear Material                                | 2 Resin & 2 Heavy Duty Resin Gears                       |                   |
| Gear Train Backlash                          | Max. 0.5°                                                |                   |
| Horn Gear Spline                             | 24T Ø6.0                                                 |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (R-O, R-X, R-I, R-D, R-C) |                   |
| IP-Rating                                    | IP4X                                                     |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                                    |                   |
| Changelog                                    | -                                                        |                   |
| *of the servo only w/o horns and accessories |                                                          |                   |



HS-325HB

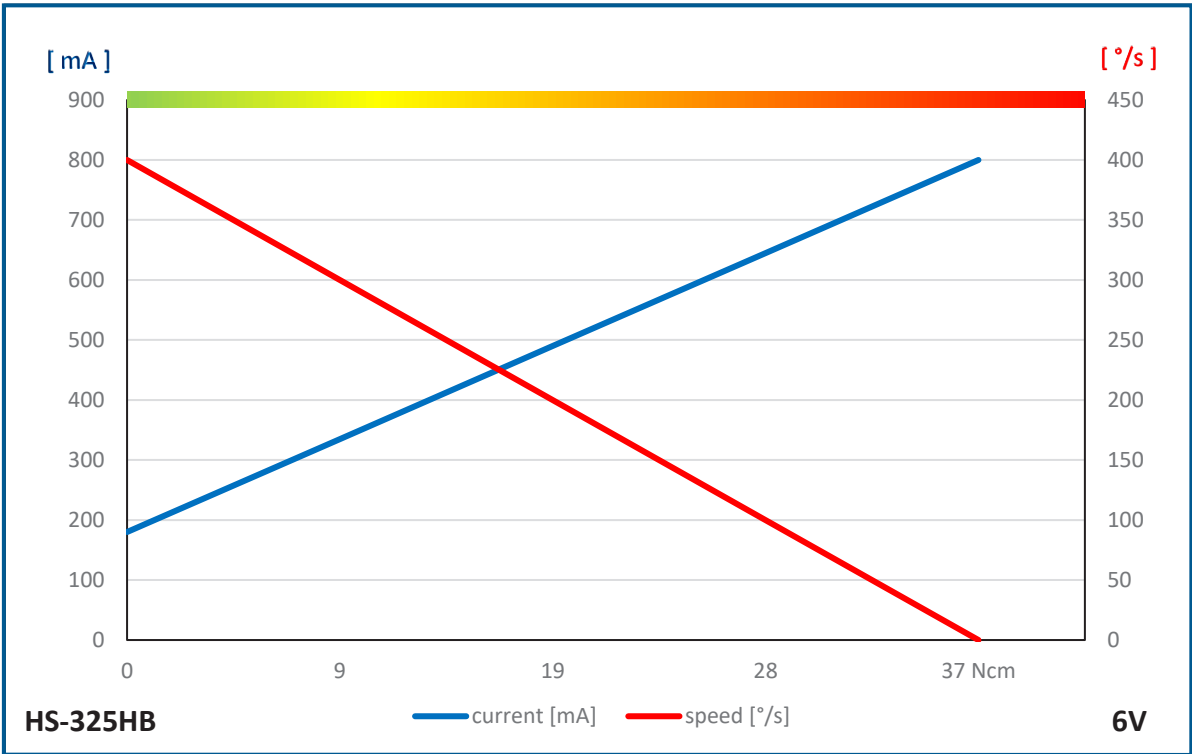
#112325

#1-02361 GP 30 Stück



1:1

PERFORMANCE CHART

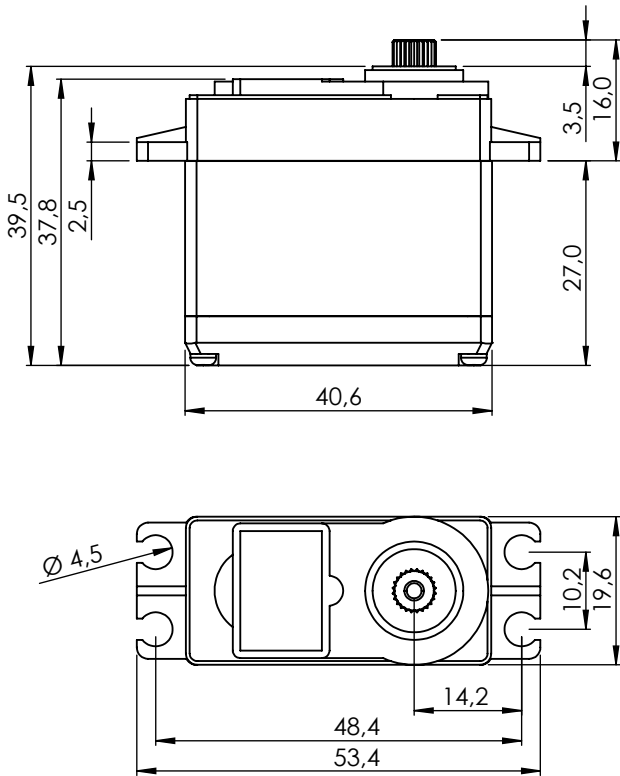


GENERAL SPECIFICATION

| HS-325HB                                     |                                                          |                   |
|----------------------------------------------|----------------------------------------------------------|-------------------|
| Control System                               | PWM                                                      |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                 |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                              |                   |
| Position Sensor Type                         | Direct Drive / 4 Slider                                  |                   |
| Motor Type                                   | Cored Metal Brush                                        |                   |
| Amplifier / MCU                              | Analog                                                   |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                              |                   |
| Operating Voltage                            | At 4.8V                                                  | At 6.0V           |
| Operating Speed at no Load                   | 316°/s (53RPM)                                           | 400°/s (67RPM)    |
| Stall Torque                                 | 3.0kgcm (29.4Ncm)                                        | 3.7kgcm (36.3Ncm) |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                                         | 0.7kgcm (6.9Ncm)  |
| Rest Current                                 | 7mA                                                      | 8mA               |
| Running Current at no Load                   | 160mA                                                    | 180mA             |
| Stall Current                                | 700mA                                                    | 800mA             |
| Deadband Width                               | 5µs                                                      | 5µs               |
| Operating Travel                             | Default                                                  | ±60°              |
|                                              | Programmable                                             | n/a               |
|                                              | Multi Turn/Continuous Rotation                           | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                            |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                            |                   |
| Vibrations at no Load                        | -                                                        |                   |
| Connector Wire Length                        | 300mm                                                    |                   |
| Connector Wire Gauge                         | 24AWG                                                    |                   |
| Connector Wire Strand Count                  | 40/0.08                                                  |                   |
| External Dimensions                          | 40.0 x 20.0 x 36.5mm                                     |                   |
| Weight*                                      | 43.0g                                                    |                   |
| Ball Bearing                                 | Dual Resin Bushing                                       |                   |
| Case Material                                | Engineering Plastic                                      |                   |
| Gear Material                                | 2 Resin & 2 Heavy Duty Resin Gears                       |                   |
| Gear Train Backlash                          | Max. 0.5°                                                |                   |
| Horn Gear Spline                             | 24T Ø6.0                                                 |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (R-O, R-X, R-I, R-D, R-C) |                   |
| IP-Rating                                    | IP4X                                                     |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                                    |                   |
| Changelog                                    | -                                                        |                   |
|                                              |                                                          |                   |
| *of the servo only w/o horns and accessories |                                                          |                   |

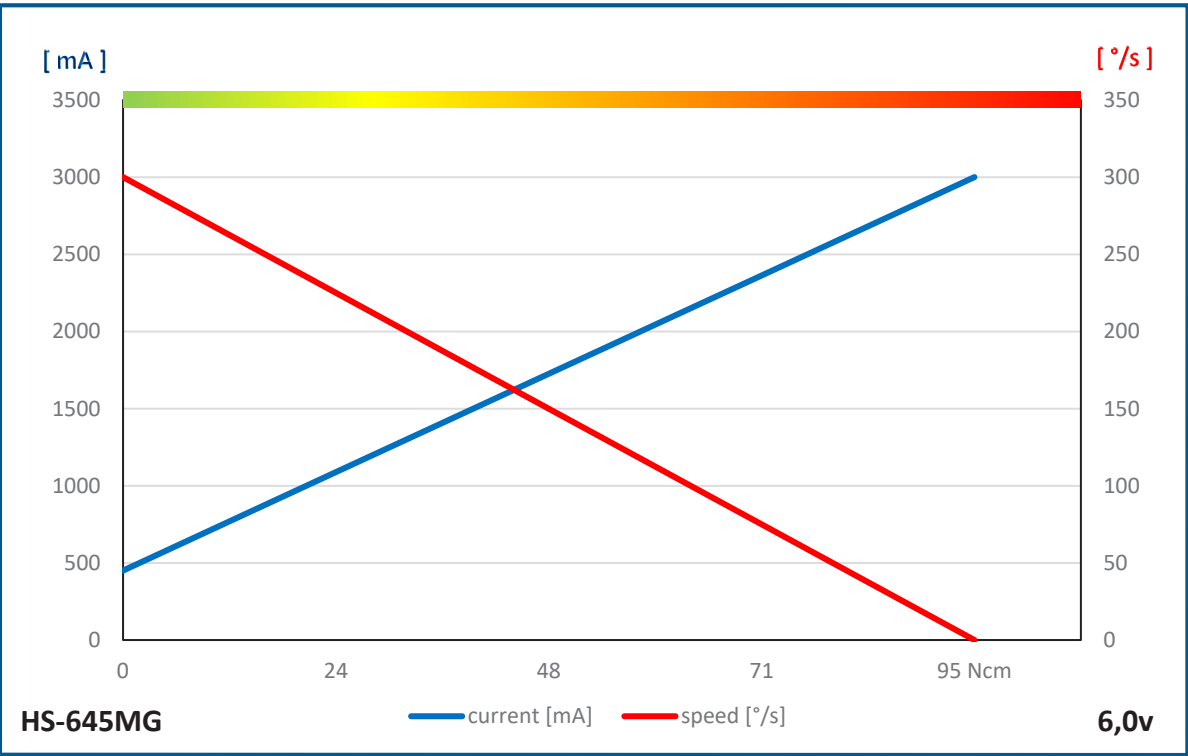
HS-645MG

#112645  
#112648 GP 30 Stück



1:1

PERFORMANCE CHART

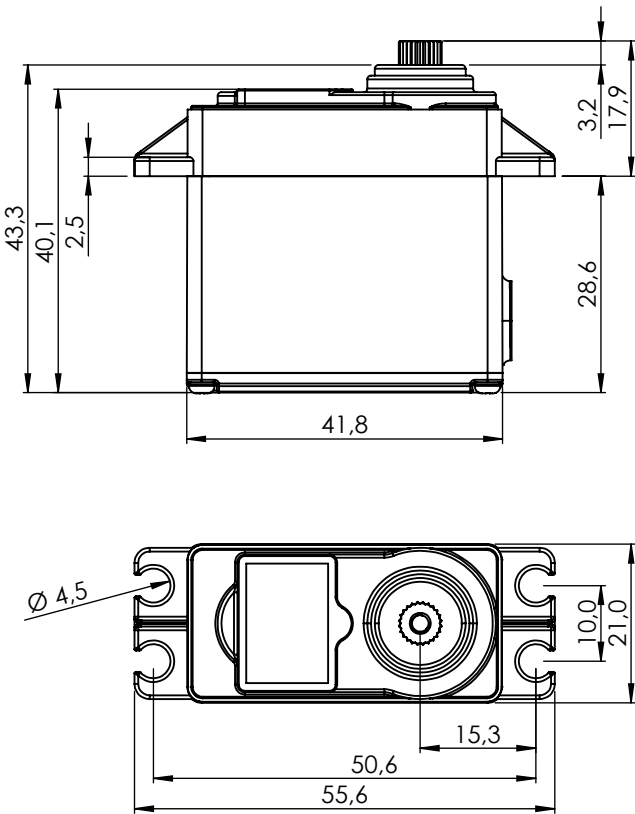


GENERAL SPECIFICATION

| HS-645MG                                     |                                                                 |                   |
|----------------------------------------------|-----------------------------------------------------------------|-------------------|
| Control System                               | PWM                                                             |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                        |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                     |                   |
| Position Sensor Type                         | Contact Analog Potentiometer                                    |                   |
| Motor Type                                   | Cored Metal Brush                                               |                   |
| Amplifier / MCU                              | Analog                                                          |                   |
| Operating Voltage Range                      | 4.8V ~ 6.0V                                                     |                   |
| Operating Voltage                            | At 4.8V                                                         | At 6.0V           |
| Operating Speed at no Load                   | 250°/s (42RPM)                                                  | 300°/s (50RPM)    |
| Stall Torque                                 | 7.7kgcm (75.5Ncm)                                               | 9.6kgcm (94.2Ncm) |
| Peak Efficiency Torque                       | 1.5kgcm (14.7Ncm)                                               | 1.9kgcm (18.6Ncm) |
| Rest Current                                 | 9mA                                                             | 9mA               |
| Running Current at no Load                   | 350mA                                                           | 450mA             |
| Stall Current                                | -                                                               | -                 |
| Deadband Width                               | 8µs                                                             | 8µs               |
| Operating Travel                             | Default                                                         | ±60°              |
|                                              | Programmable                                                    | n/a               |
|                                              | Multi Turn/Continuous Rotation                                  | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                   |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-31°F ~ +176°F)                                  |                   |
| Vibrations at no Load                        | -                                                               |                   |
| Connector Wire Length                        | 300mm                                                           |                   |
| Connector Wire Gauge                         | 22AWG                                                           |                   |
| Connector Wire Strand Count                  | 60/0.08                                                         |                   |
| External Dimensions                          | 40.6 x 19.6 x 37.8mm                                            |                   |
| Weight*                                      | 55.2g                                                           |                   |
| Ball Bearing                                 | Dual Ball Bearing                                               |                   |
| Case Material                                | Engineering Plastic                                             |                   |
| Gear Material                                | 1 Metal-Plastic Gear & 3 Metal Gears                            |                   |
| Gear Train Backlash                          | Max. 0.5°                                                       |                   |
| Horn Gear Spline                             | 24T / Ø6.0                                                      |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (R-O, R-XA, HD-IS, HD-LS, HD-OS) |                   |
| IP-Rating                                    | IP4X                                                            |                   |
| Revision                                     | Rev. 1.1 / 04.01.2024                                           |                   |
| Changelog                                    | -                                                               |                   |
|                                              |                                                                 |                   |
| *of the servo only w/o horns and accessories |                                                                 |                   |

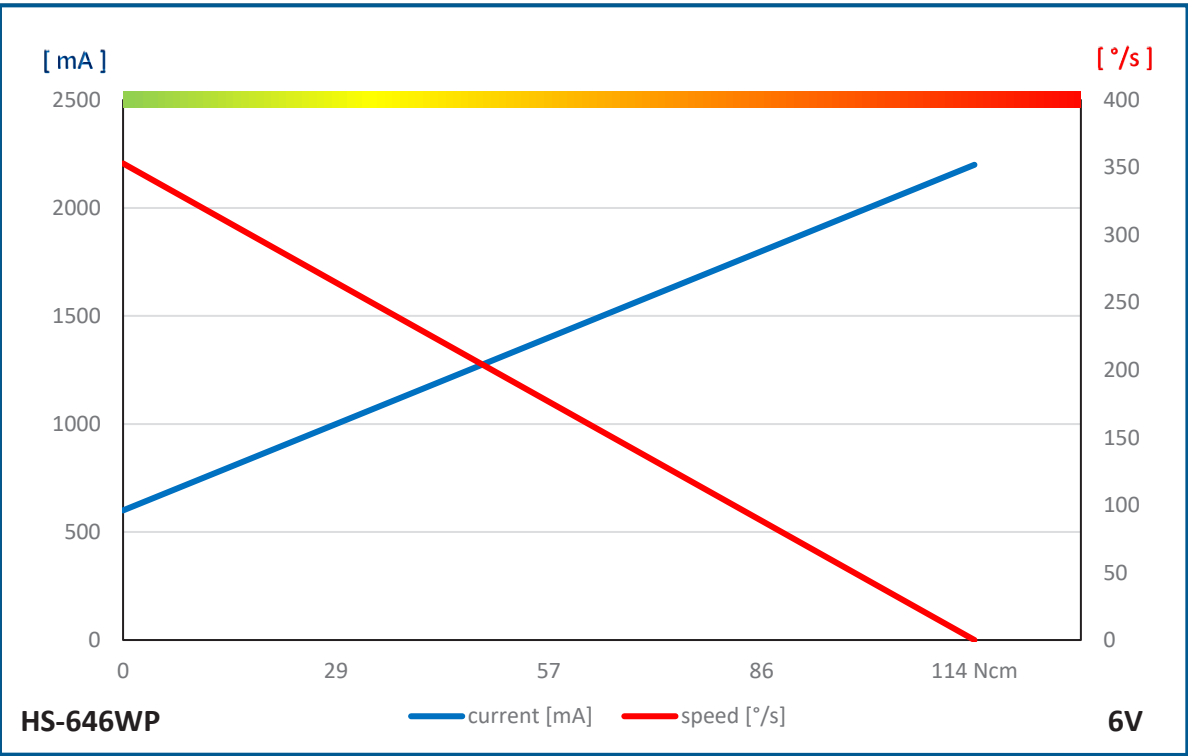
HS-646WP

#115646  
#1-02352 GP 24 Stück



1:1

PERFORMANCE CHART

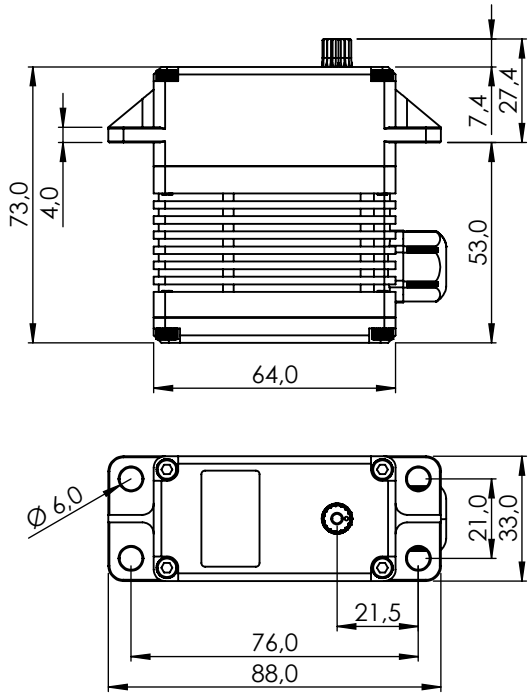


GENERAL SPECIFICATION

| HS-646WP                                     |                                                                 |                     |
|----------------------------------------------|-----------------------------------------------------------------|---------------------|
| Control System                               | PWM                                                             |                     |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs                        |                     |
| Connector Type                               | Hitec 3P (JR 3P compatible)                                     |                     |
| Position Sensor Type                         | Indirect Drive / 4 Slider / 1M cycle Long Life                  |                     |
| Motor Type                                   | Cored Carbon Brush / 3 Pole Ferrite Motor                       |                     |
| Amplifier / MCU                              | Analog                                                          |                     |
| Operating Voltage Range                      | 6.0V ~ 7.4V                                                     |                     |
| Operating Voltage                            | At 6.0V                                                         | At 7.4V             |
| Operating Speed at no Load                   | 300°/s (50RPM)                                                  | 353°/s (59RPM)      |
| Stall Torque                                 | 9.6kgcm (94.2Ncm)                                               | 11.6kgcm (113.8Ncm) |
| Peak Efficiency Torque                       | 1.9kgcm (18.6Ncm)                                               | 2.3kgcm (22.6Ncm)   |
| Rest Current                                 | 8mA                                                             | 8mA                 |
| Running Current at no Load                   | 400mA                                                           | 600mA               |
| Stall Current                                | 2000mA                                                          | 2200mA              |
| Deadband Width                               | 4µs                                                             | 4µs                 |
| Operating Travel                             | Default                                                         | ±60°                |
|                                              | Programmable                                                    | n/a                 |
|                                              | Multi Turn/Continuous Rotation                                  | n/a / n/a           |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                                   |                     |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                                   |                     |
| Vibrations at no Load                        | -                                                               |                     |
| Connector Wire Length                        | 300mm                                                           |                     |
| Connector Wire Gauge                         | 22AWG                                                           |                     |
| Connector Wire Strand Count                  | 60/0.08                                                         |                     |
| External Dimensions                          | 41.8 x 21.0 x 40.0mm                                            |                     |
| Weight*                                      | 61.0g                                                           |                     |
| Ball Bearing                                 | Dual Ball Bearing                                               |                     |
| Case Material                                | Engineering Plastic                                             |                     |
| Gear Material                                | 1 Metal-Plastic & 3 Metal Gears                                 |                     |
| Gear Train Backlash                          | Max. 0.5°                                                       |                     |
| Horn Gear Spline                             | 24T Ø6.0                                                        |                     |
| Accessories                                  | Mounting Hardware, Servo Horns (R-O, R-XA, HD-IS, HD-LS, HD-OS) |                     |
| IP-Rating                                    | IP67                                                            |                     |
| Revision                                     | Rev. 1.1 / 04.01.2024                                           |                     |
| Changelog                                    | -                                                               |                     |
|                                              |                                                                 |                     |
| *of the servo only w/o horns and accessories |                                                                 |                     |

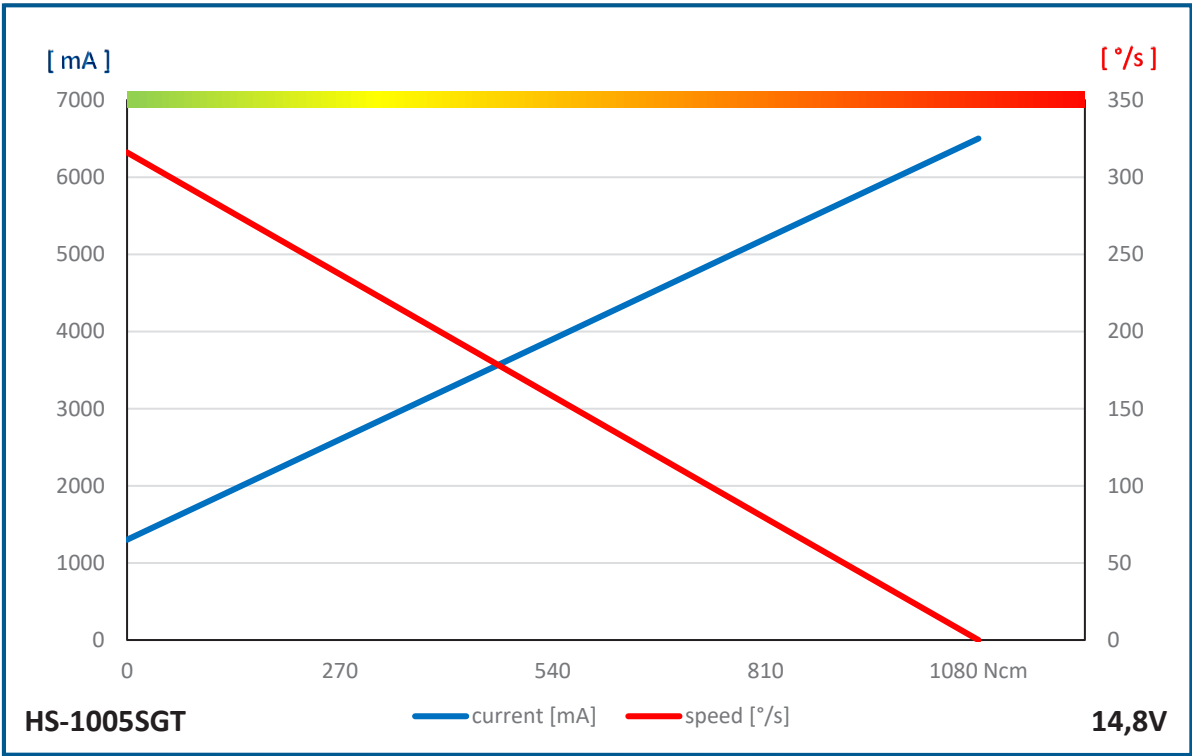
HS-1005SGT

#138105



1:2

PERFORMANCE CHART



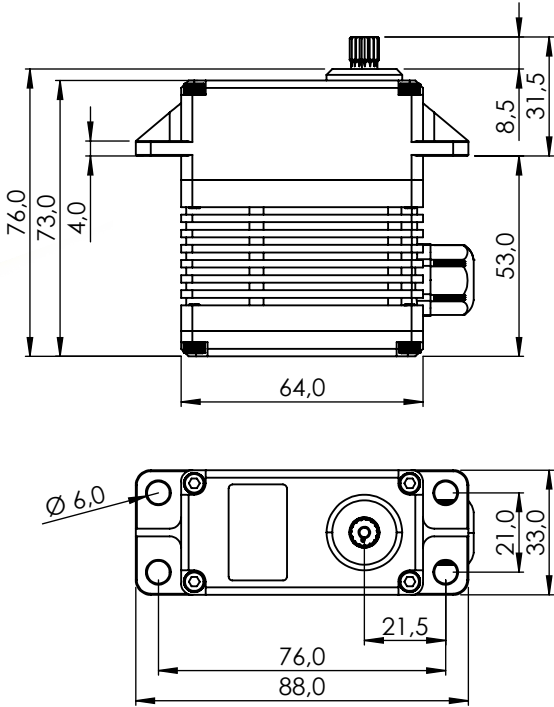
GENERAL SPECIFICATION

| HS-1005SGT                                   |                                          |                       |
|----------------------------------------------|------------------------------------------|-----------------------|
| Control System                               | PWM                                      |                       |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs |                       |
| Connector Type                               | Hitec 3P (JR 3P compatible)              |                       |
| Position Sensor Type                         | Indirect Drive / 1M Cycle Long Life      |                       |
| Motor Type                                   | Cored Carbon Brush                       |                       |
| Amplifier / MCU                              | Digital with Mosfet Drive                |                       |
| Operating Voltage Range                      | 9.0V ~ 16.8V (Signal: 3.5V ~ 8.4V)       |                       |
| Operating Voltage                            | At 11.1V                                 | At 14.8V              |
| Operating Speed at no Load                   | 231°/s (38RPM)                           | 316°/s (53RPM)        |
| Stall Torque                                 | 84.0kgcm (824.0Ncm)                      | 110.0kgcm (1079.1Ncm) |
| Peak Efficiency Torque                       | 16.8kgcm (164.8Ncm)                      | 22.0kgcm (215.8Ncm)   |
| Rest Current                                 | 90mA                                     | 130mA                 |
| Running Current at no Load                   | 1100mA                                   | 1300mA                |
| Stall Current                                | 5500mA                                   | 6500mA                |
| Deadband Width                               | 2µs                                      | 2µs                   |
| Operating Travel                             | Default                                  | ±60°                  |
|                                              | Programmable                             | n/a                   |
|                                              | Multi Turn/Continuous Rotation           | n/a / n/a             |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)            |                       |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)            |                       |
| Vibrations at no Load                        | IEC-60068-2-64                           |                       |
| Connector Wire Length                        | 250mm                                    |                       |
| Connector Wire Gauge                         | 18AWG (Signal: 20AWG)                    |                       |
| Connector Wire Strand Count                  | 120/0.08 (80/0.08)                       |                       |
| External Dimensions                          | 64.0 x 33.0 x 73.0mm                     |                       |
| Weight*                                      | 310.0g                                   |                       |
| Ball Bearing                                 | Dual Ball Bearing                        |                       |
| Case Material                                | Aluminum Alloy                           |                       |
| Gear Material                                | 1 Metal-Plastic & 3 Steel Gears          |                       |
| Gear Train Backlash                          | Max. 0.5°                                |                       |
| Horn Gear Spline                             | 15T Ø8.0                                 |                       |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MO)     |                       |
| IP-Rating                                    | IP54                                     |                       |
| Revision                                     | Rev. 1.1 / 04.01.2024                    |                       |
| Changelog                                    | -                                        |                       |
| *of the servo only w/o horns and accessories |                                          |                       |

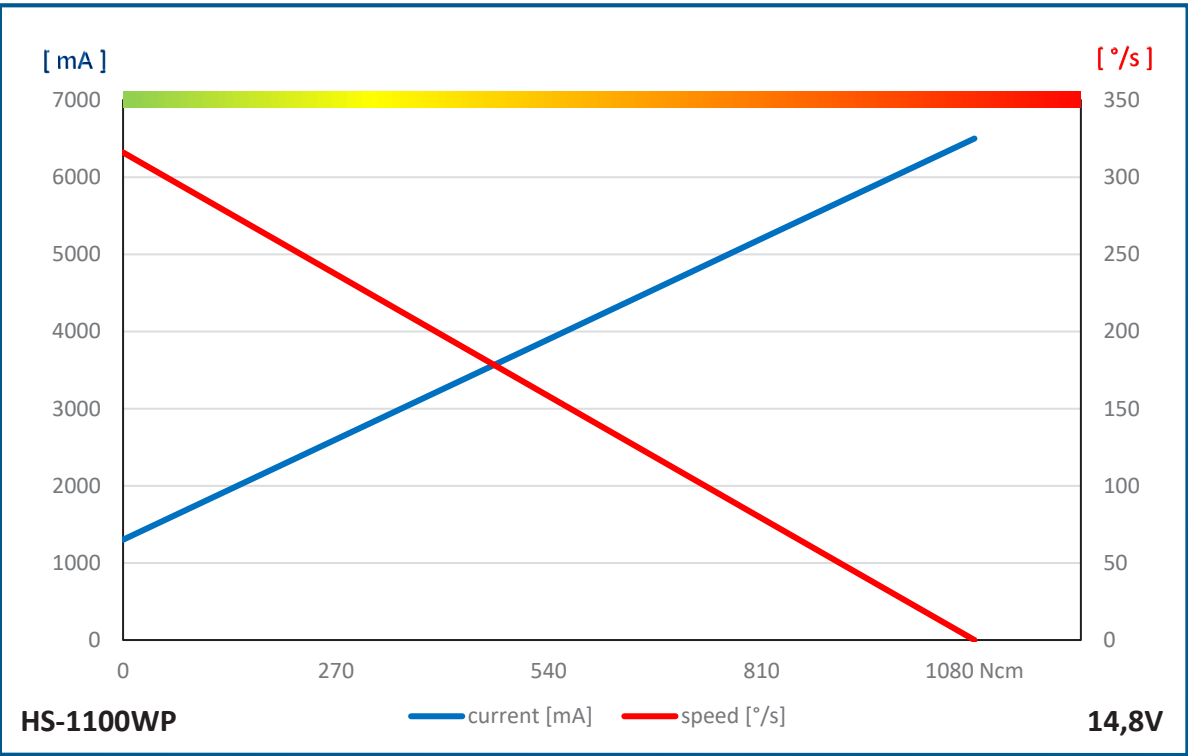


HS-1100WP

#138100



PERFORMANCE CHART

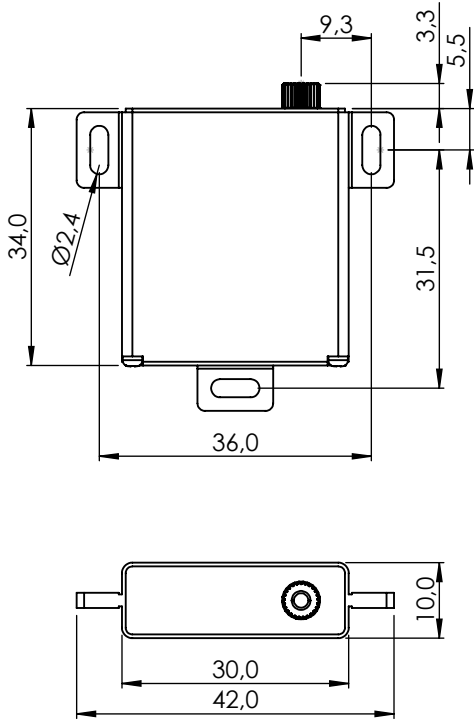


GENERAL SPECIFICATION

| General Specification                        |                                           | HS-1100WP |                       |
|----------------------------------------------|-------------------------------------------|-----------|-----------------------|
| Control System                               | PWM                                       |           |                       |
|                                              | Pulse Width  900µs 1500µs (Center) 2100µs |           |                       |
| Connector Type                               | Hitec 3P (JR 3P compatible)               |           |                       |
| Position Sensor Type                         | Indirect Drive / 1M Cycle Long Life       |           |                       |
| Motor Type                                   | 5 Poles DC Cored Carbon Brush             |           |                       |
| Amplifier / MCU                              | Digital with Mosfet Drive                 |           |                       |
| Operating Voltage Range                      | 9.0V ~ 16.8V (Signal: 3.5V ~ 8.4V)        |           |                       |
| Operating Voltage                            | At 11.1V                                  |           | At 14.8V              |
| Operating Speed at no Load                   | 231°/s (38RPM)                            |           | 316°/s (53RPM)        |
| Stall Torque                                 | 84.0kgcm (824.0Ncm)                       |           | 110.0kgcm (1079.1Ncm) |
| Peak Efficiency Torque                       | 16.8kgcm (164.8Ncm)                       |           | 22.0kgcm (215.8Ncm)   |
| Rest Current                                 | 90mA                                      |           | 130mA                 |
| Running Current at no Load                   | 1100mA                                    |           | 1300mA                |
| Stall Current                                | 5500mA                                    |           | 6500mA                |
| Deadband Width                               | 2µs                                       |           | 2µs                   |
| Operating Travel                             | Default                                   |           | ±60°                  |
|                                              | Programmable                              |           | n/a                   |
|                                              | Multi Turn/Continuous Rotation            |           | n/a / n/a             |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)             |           |                       |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)             |           |                       |
| Vibrations at no Load                        | -                                         |           |                       |
| Connector Wire Length                        | 250mm                                     |           |                       |
| Connector Wire Gauge                         | 18AWG (Signal: 20AWG)                     |           |                       |
| Connector Wire Strand Count                  | 120/0.08 (80/0.08)                        |           |                       |
| External Dimensions                          | 64.0 x 33.0 x 73.0mm                      |           |                       |
| Weight*                                      | 320.0g                                    |           |                       |
| Ball Bearing                                 | Dual Ball Bearing & Dual Needle Bearing   |           |                       |
| Case Material                                | Aluminum Alloy                            |           |                       |
| Gear Material                                | 1 Metal-Plastic & 3 Steel Gears           |           |                       |
| Gear Train Backlash                          | Max. 0.5°                                 |           |                       |
| Horn Gear Spline                             | 15T Ø8.0                                  |           |                       |
| Accessories                                  | Mounting Hardware, Servo Horn (I-MO)      |           |                       |
| IP-Rating                                    | IP67                                      |           |                       |
| Revision                                     | Rev. 1.1 / 04.01.2024                     |           |                       |
| Changelog                                    | -                                         |           |                       |
|                                              |                                           |           |                       |
| *of the servo only w/o horns and accessories |                                           |           |                       |

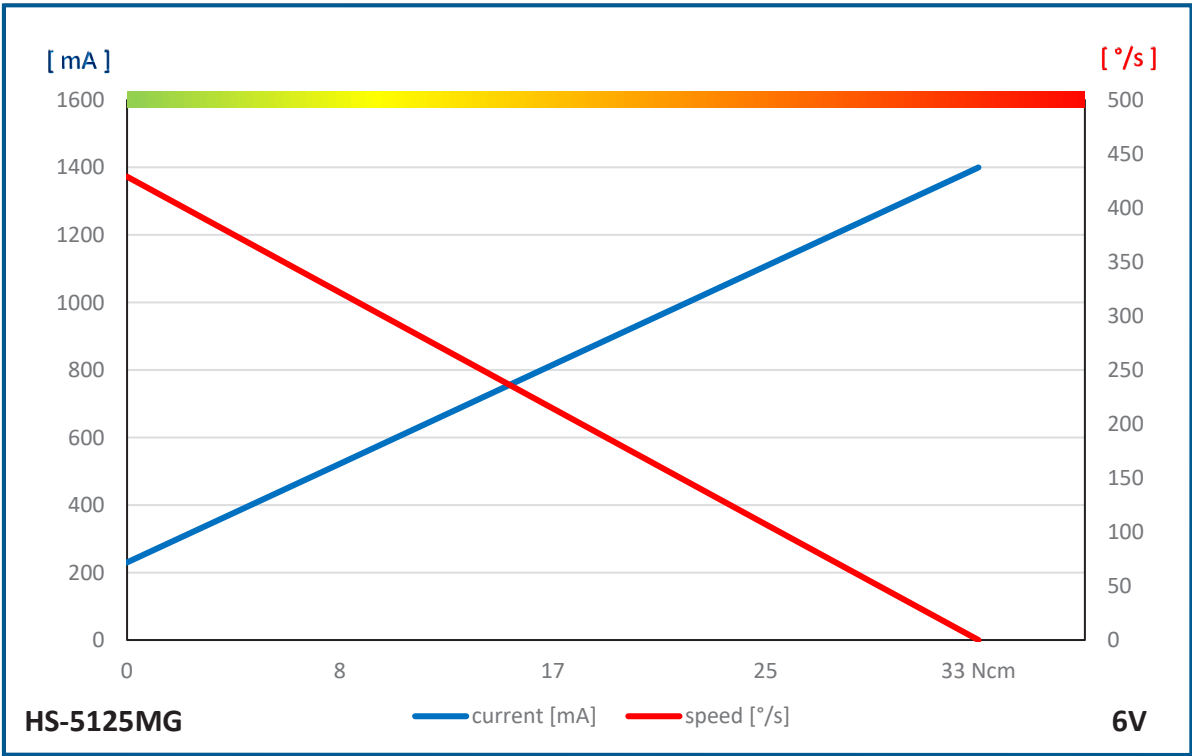
HS-5125MG

#113125  
#1-03035 GP 15 Stück



1:1

PERFORMANCE CHART

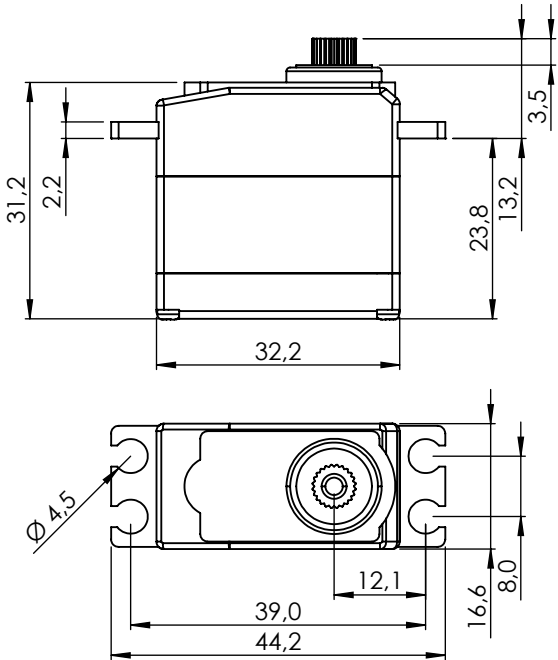


GENERAL SPECIFICATION

| HS-5125MG                                    |                                                  |                   |
|----------------------------------------------|--------------------------------------------------|-------------------|
| Control System                               | PWM                                              |                   |
|                                              | Pulse Width 900µs 1500µs (Center) 2100µs         |                   |
| Connector Type                               | Hitec 3P (JR 3P compatible)                      |                   |
| Position Sensor Type                         | Contact Analog Potentiometer                     |                   |
| Motor Type                                   | Cored Metal Brush                                |                   |
| Amplifier / MCU                              | 8bit programmable Digital                        |                   |
| Operating Voltage Range                      | 3.5V ~ 8.4V                                      |                   |
| Operating Voltage                            | At 4.8V                                          | At 6.0V           |
| Operating Speed at no Load                   | 333°/s (56RPM)                                   | 429°/s (71RPM)    |
| Stall Torque                                 | 2.8kgcm (27.5Ncm)                                | 3.3kgcm (32.4Ncm) |
| Peak Efficiency Torque                       | 0.6kgcm (5.9Ncm)                                 | 0.7kgcm (6.9Ncm)  |
| Rest Current                                 | 3mA                                              | 3mA               |
| Running Current at no Load                   | 180mA                                            | 230mA             |
| Stall Current                                | 1100mA                                           | 1400mA            |
| Deadband Width                               | 2µs                                              | 2µs               |
| Operating Travel                             | Default                                          | ±60°              |
|                                              | Programmable                                     | Max. 175°         |
|                                              | Multi Turn/Continuous Rotation                   | n/a / n/a         |
| Operating Temperature Range                  | -20°C ~ +60°C (-4°F ~ +140°F)                    |                   |
| Storage Temperature Range                    | -30°C ~ +80°C (-22°F ~+176°F)                    |                   |
| Vibrations at no Load                        | -                                                |                   |
| Connector Wire Length                        | 300mm                                            |                   |
| Connector Wire Gauge                         | 22AWG                                            |                   |
| Connector Wire Strand Count                  | 60/0.08                                          |                   |
| External Dimensions                          | 30.0 x 10.0 x 34.0mm                             |                   |
| Weight*                                      | 24.0g                                            |                   |
| Ball Bearing                                 | Dual Ball Bearing                                |                   |
| Case Material                                | Engineering Plastic                              |                   |
| Gear Material                                | 1 Metal-Plastic & 4 Metal Gears                  |                   |
| Gear Train Backlash                          | Max. 0.5°                                        |                   |
| Horn Gear Spline                             | 25T Ø5.0                                         |                   |
| Accessories                                  | Mounting Hardware, Servo Horns (MS-L25, MS-ML25) |                   |
| IP-Rating                                    | IP4X                                             |                   |
| Revision                                     | Rev. 1.0 / 08.01.2024                            |                   |
| Changelog                                    | -                                                |                   |
|                                              |                                                  |                   |
| *of the servo only w/o horns and accessories |                                                  |                   |

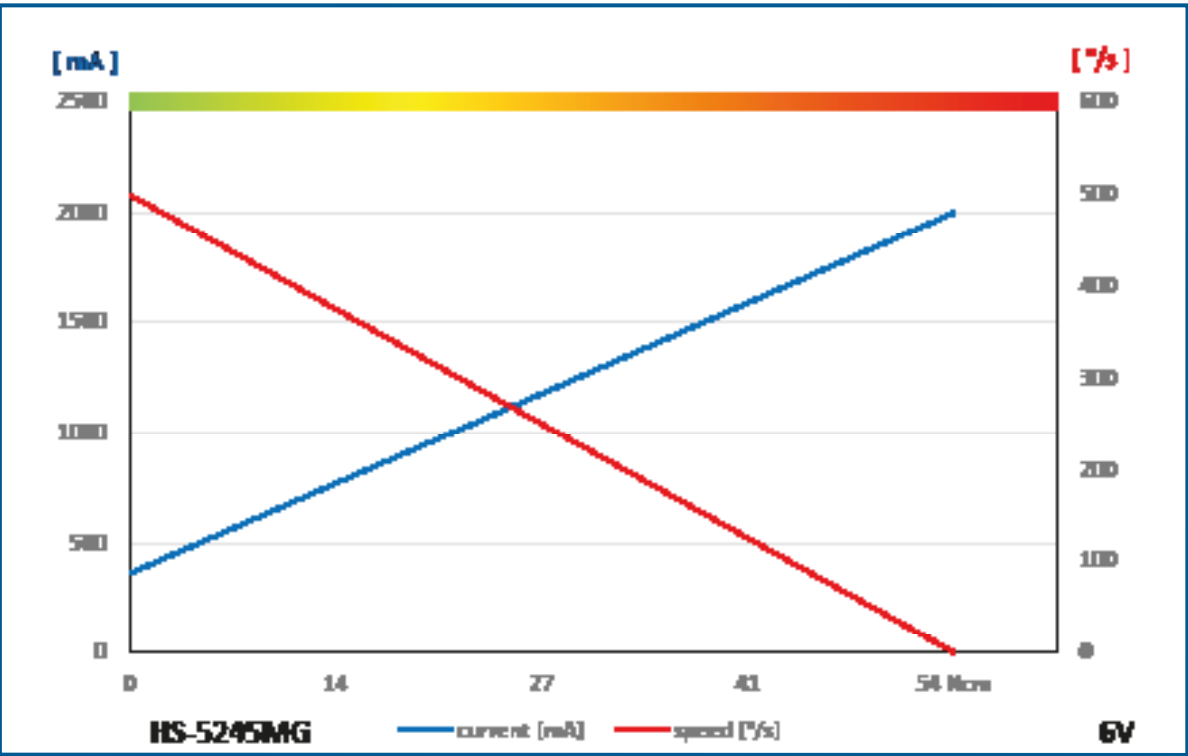
HS-5245MG

#113245



1:1

PERFORMANCE CHART

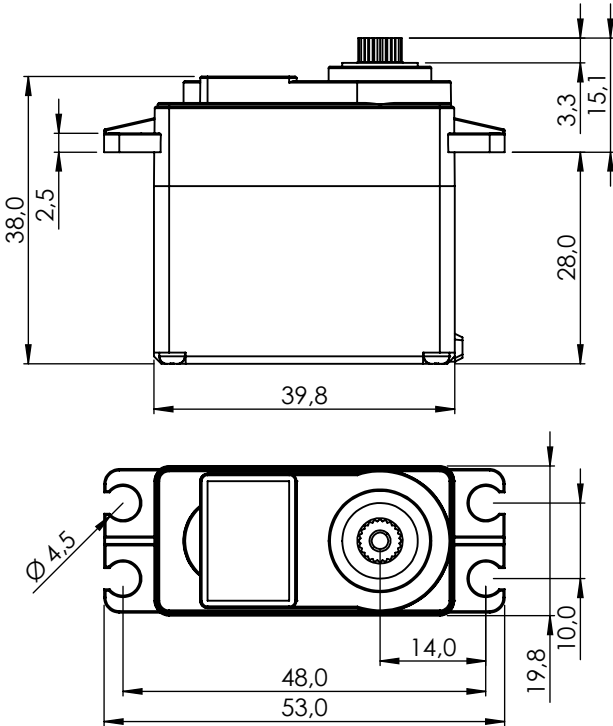


GENERAL SPECIFICATION

| HS-5245MG                                                                          |                                        |                        |
|------------------------------------------------------------------------------------|----------------------------------------|------------------------|
| Control System                                                                     | PWM                                    |                        |
|                                                                                    | Pulse Width: 900~2100μs(Center:1500μs) |                        |
| Connector Type                                                                     |                                        |                        |
| Position Sensor Type                                                               | Contact Analog Potentiometer           |                        |
| Motor Type                                                                         | Cored Metal Brush                      |                        |
| Amplifier / MCU                                                                    | 8bit programmable Digital              |                        |
| Operating Voltage Range**                                                          | 3.5V ~ 8.4V                            |                        |
| Operating Voltage                                                                  | At 4,8V                                | At 6,0V                |
| Operating Speed at no Load                                                         | 0.15sec/60°                            | 0.12sec/60°            |
| Stall Torque                                                                       | 4.4kgf·cm (61.1 oz·in)                 | 5.5kgf·cm (76.4 oz·in) |
| Peak Efficiency Torque                                                             | 0.9kgf·cm (12.5 oz·in)                 | 1.1kgf·cm (15.3 oz·in) |
| Rest Current                                                                       | 3mA                                    | 3mA                    |
| Running Current at no Load                                                         | 260mA                                  | 360mA                  |
| Stall Current                                                                      | 1,600mA                                | 2,000mA                |
| Deadband Width                                                                     | 2μs                                    | 2μs                    |
| Operating Travel                                                                   | Default                                | ±60°                   |
|                                                                                    | Programmable                           | Max. 175°              |
|                                                                                    |                                        |                        |
| Operating Temperature Range                                                        | -20°C ~ +60°C (-4°F ~ +140°F)          |                        |
| Storage Temperature Range                                                          | -30°C ~ +80°C (-22°F ~+176°F)          |                        |
| Vibrations at no Load                                                              | -                                      |                        |
| Connector Wire Length                                                              | 300mm                                  |                        |
| Connector Wire Gauge                                                               | 22AWG                                  |                        |
| Connector Wire Strand Count                                                        |                                        |                        |
| External Dimensions                                                                | 32.2mm x 16.8mm x 31.0mm               |                        |
| Weight*                                                                            | 32.0g                                  |                        |
| Ball Bearing                                                                       | 2 Ball Bearing                         |                        |
| Case Material                                                                      | Engineering Plastic                    |                        |
| Gear Material                                                                      | 1 Metal-Plastic & 3 Metal Gears        |                        |
| Gear Train Backlash                                                                | Max. 0.5°                              |                        |
| Horn Gear Spline                                                                   | 24T Ø6.0                               |                        |
| Accessories                                                                        |                                        |                        |
| IP-Rating                                                                          | IP4X                                   |                        |
| Revision                                                                           |                                        |                        |
| Changelog                                                                          | -                                      |                        |
| *of the servo only w/o horns and accessories                                       |                                        |                        |
| **At the Max voltage, it is recommended to be used only for a short time duration. |                                        |                        |

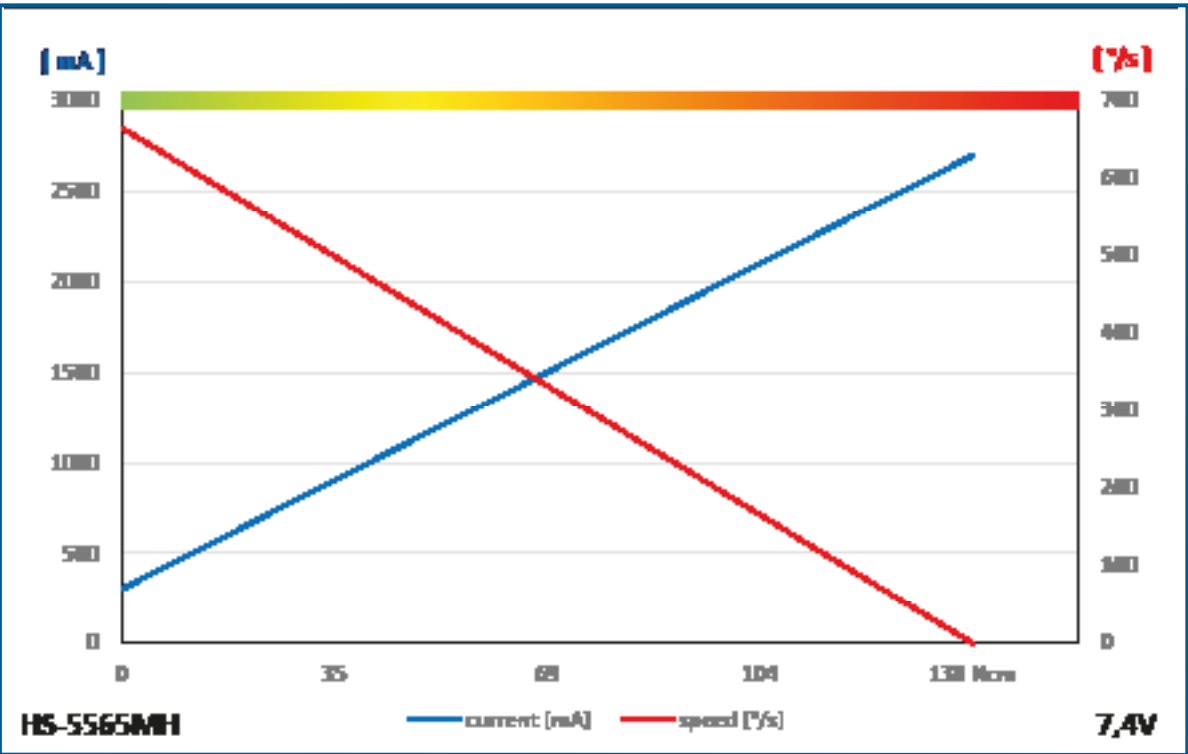
HS-5565MG

#114565



1:1

PERFORMANCE CHART



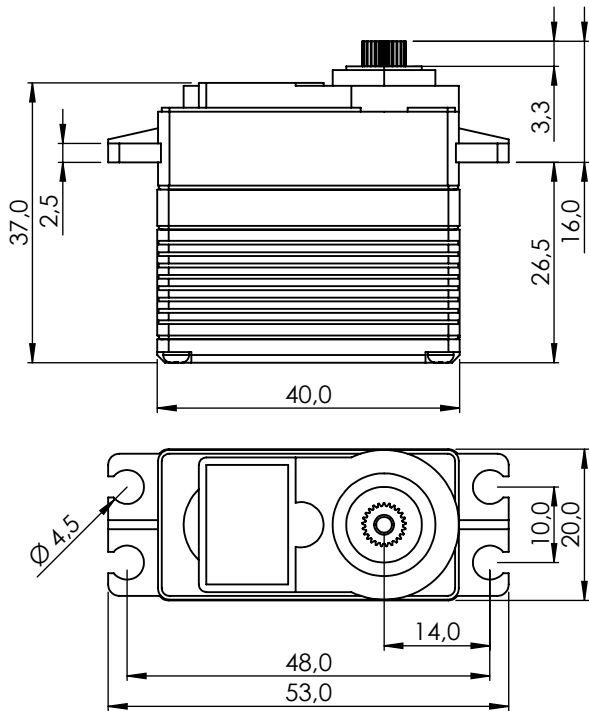
GENERAL SPECIFICATION

| HS-5565MG                                                                          |                                        |                          |
|------------------------------------------------------------------------------------|----------------------------------------|--------------------------|
| Control System                                                                     | PWM                                    |                          |
|                                                                                    | Pulse Width: 900~2100μs(Center:1500μs) |                          |
| Connector Type                                                                     |                                        |                          |
| Position Sensor Type                                                               | Contact Analog Potentiometer           |                          |
| Motor Type                                                                         | Cored Metal Brush                      |                          |
| Amplifier / MCU                                                                    | 8bit programmable Digital              |                          |
| Operating Voltage Range**                                                          | 3.5V ~ 8.4V                            |                          |
| Operating Voltage                                                                  | At 6.0V                                | At 7.4V                  |
| Operating Speed at no Load                                                         | 0.11sec/60°                            | 0.09sec/60°              |
| Stall Torque                                                                       | 11.0kgf·cm (152.8 oz·in)               | 14.0kgf·cm (194.4 oz·in) |
| Peak Efficiency Torque                                                             | 2.2kgf·cm (30.6 oz·in)                 | 2.8kgf·cm (38.9 oz·in)   |
| Rest Current                                                                       | 4mA                                    | 4mA                      |
| Running Current at no Load                                                         | 260mA                                  | 300mA                    |
| Stall Current                                                                      | 2,100mA                                | 2,700mA                  |
| Deadband Width                                                                     | 2μs                                    | 2μs                      |
| Operating Travel                                                                   | Default                                | ±60°                     |
|                                                                                    | Programmable                           | Max. 175°                |
|                                                                                    | Continuous Rotation                    | n/a                      |
| Operating Temperature Range                                                        | -20°C ~ +60°C (-4°F ~+140°F)           |                          |
| Storage Temperature Range                                                          | -30°C ~ +80°C (-22°F ~+176°F)          |                          |
| Vibrations at no Load                                                              | -                                      |                          |
| Connector Wire Length                                                              | 300mm (11.811inch)                     |                          |
| Connector Wire Gauge                                                               | 24AWG                                  |                          |
| Connector Wire Strand Count                                                        |                                        |                          |
| External Dimensions                                                                | 40.0mm x 20.0mm x 38.0mm               |                          |
| Weight*                                                                            | 59.0g                                  |                          |
| Ball Bearing                                                                       | 2 Ball Bearing                         |                          |
| Case Material                                                                      | Engineering Plastic                    |                          |
| Gear Material                                                                      | 1 Metal-Plastic & 3 Metal Gears        |                          |
| Gear Train Backlash                                                                | Max. 0.5°                              |                          |
| Horn Gear Spline                                                                   | 24T Ø6.0                               |                          |
| Accessories                                                                        |                                        |                          |
| IP-Rating                                                                          | IP54                                   |                          |
| Revision                                                                           |                                        |                          |
| Changelog                                                                          | -                                      |                          |
| *of the servo only w/o horns and accessories                                       |                                        |                          |
| **At the Max voltage, it is recommended to be used only for a short time duration. |                                        |                          |



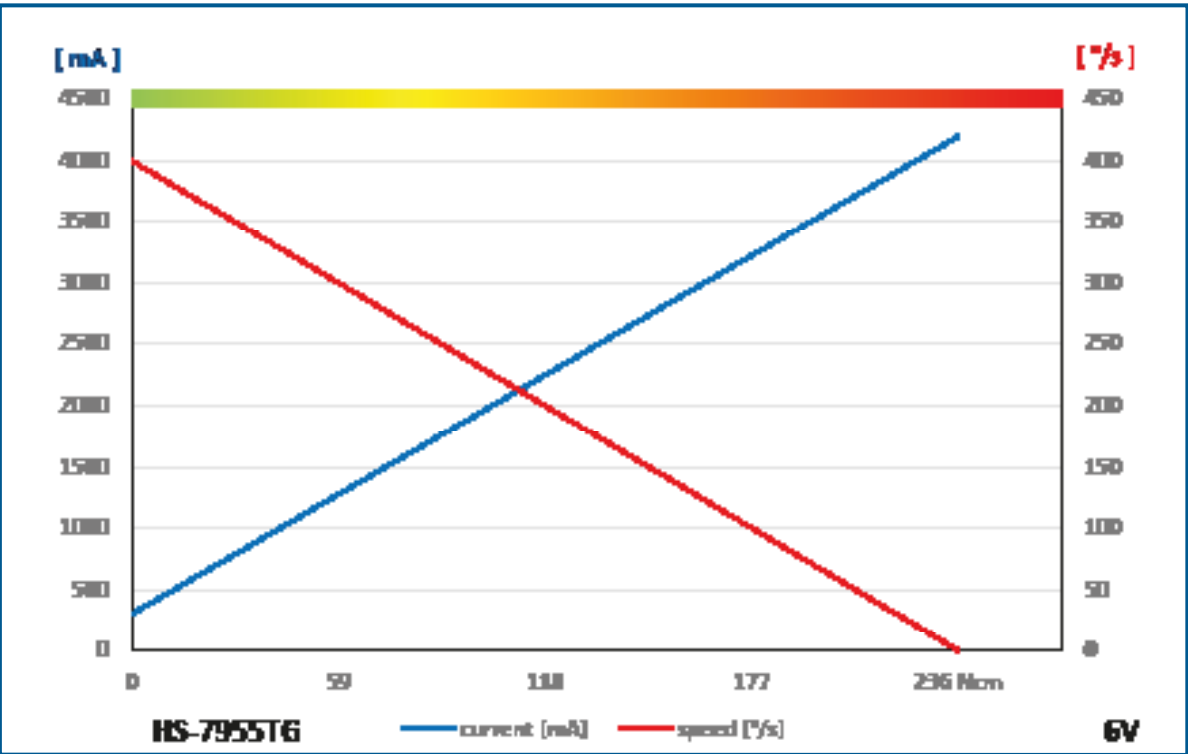
HS-7955TG

#113957



1:1

PERFORMANCE CHART

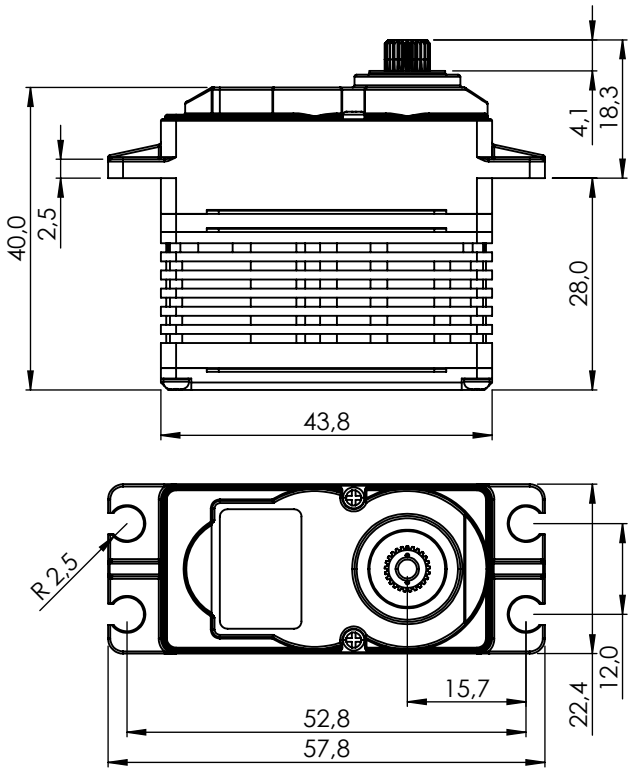


GENERAL SPECIFICATION

| HS-7955TG                                                                          |                                          |                          |
|------------------------------------------------------------------------------------|------------------------------------------|--------------------------|
| Control System                                                                     | PWM                                      |                          |
|                                                                                    | Pulse Width: 900~2100μs(Center:1500μs)   |                          |
| Connector Type                                                                     |                                          |                          |
| Position Sensor Type                                                               | Contact Analog Potentiometer             |                          |
| Motor Type                                                                         | Coreless                                 |                          |
| Amplifier / MCU                                                                    | 8bit programmable Digital                |                          |
| Operating Voltage Range**                                                          | 3.5V ~ 8.4V                              |                          |
| Operating Voltage                                                                  | At 4.8V                                  | At 6.0V                  |
| Operating Speed at no Load                                                         | 0.19sec/60°                              | 0.15sec/60°              |
| Stall Torque                                                                       | 18.0kgf·cm (250.0 oz·in)                 | 24.0kgf·cm (333.3 oz·in) |
| Peak Efficiency Torque                                                             | 3.6kgf·cm (50.0 oz·in)                   | 4.8kgf·cm (66.7 oz·in)   |
| Rest Current                                                                       | 9mA                                      | 9mA                      |
| Running Current at no Load                                                         | 220mA                                    | 300mA                    |
| Stall Current                                                                      | 3,400mA                                  | 4,200mA                  |
| Deadband Width                                                                     | 1μs                                      | 1μs                      |
| Operating Travel                                                                   | Default                                  | ±60°                     |
|                                                                                    | Programmable                             | Max. 175°                |
|                                                                                    |                                          |                          |
| Operating Temperature Range                                                        | -20°C ~ +60°C (-4°F ~ +140°F)            |                          |
| Storage Temperature Range                                                          | -30°C ~ +80°C (-22°F ~+176°F)            |                          |
| Vibrations at no Load                                                              | -                                        |                          |
| Connector Wire Length                                                              | 300mm                                    |                          |
| Connector Wire Gauge                                                               | 22AWG                                    |                          |
| Connector Wire Strand Count                                                        |                                          |                          |
| External Dimensions                                                                | 40.0mm x 20.0mm x 37.0mm                 |                          |
| Weight*                                                                            | 65.0g                                    |                          |
| Ball Bearing                                                                       | 2 Ball Bearing                           |                          |
| Case Material                                                                      | Engineering Plastic & Aluminum Heat Sink |                          |
| Gear Material                                                                      | 1 Metal-Plastic & 3 Titanium Alloy Gears |                          |
| Gear Train Backlash                                                                | Max. 0.5°                                |                          |
| Horn Gear Spline                                                                   | 24T Ø6.0                                 |                          |
| Accessories                                                                        |                                          |                          |
| IP-Rating                                                                          |                                          |                          |
| Revision                                                                           |                                          |                          |
| Changelog                                                                          | -                                        |                          |
| *of the servo only w/o horns and accessories                                       |                                          |                          |
| **At the Max voltage, it is recommended to be used only for a short time duration. |                                          |                          |

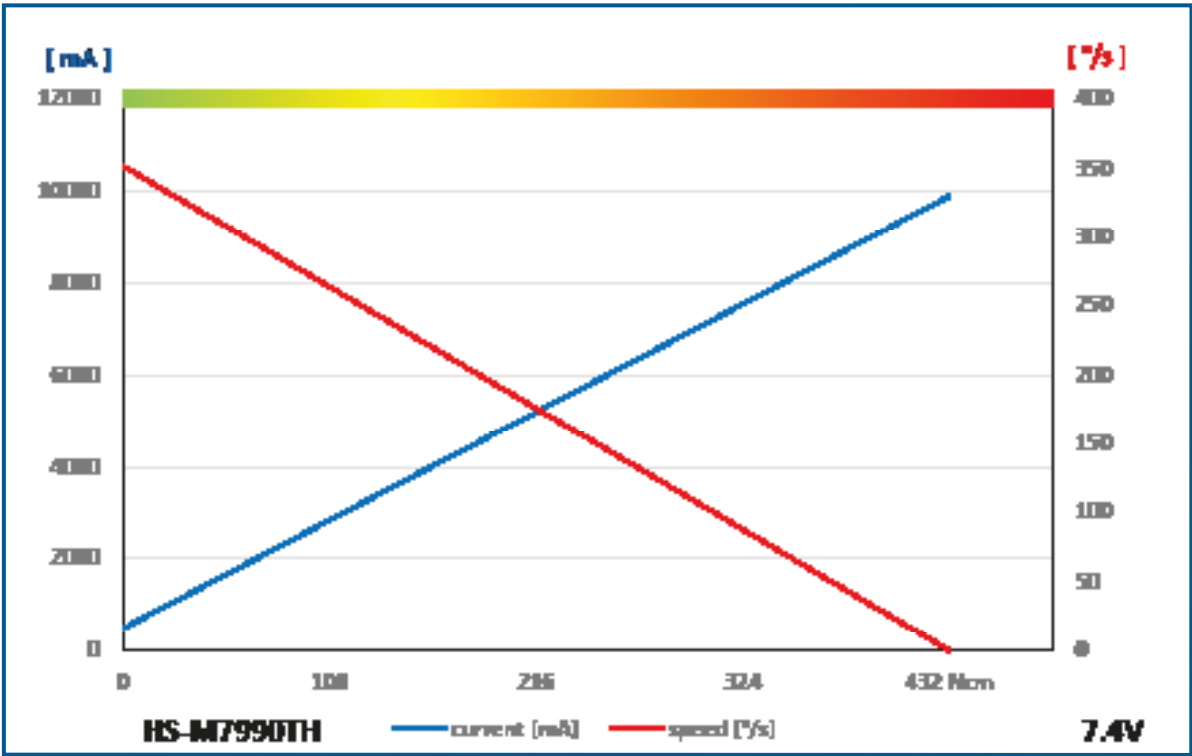
HS-M7990TH

#114990



1:1

PERFORMANCE CHART

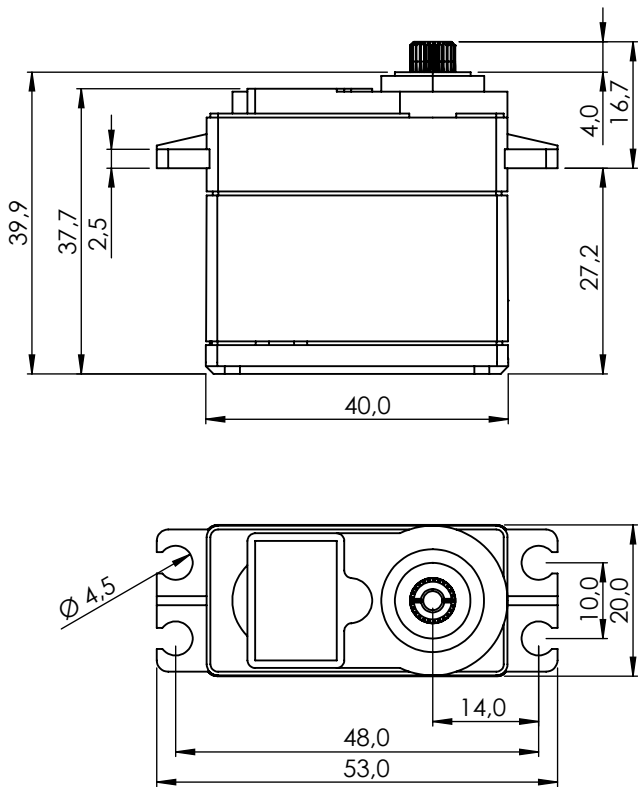


GENERAL SPECIFICATION

| HS-M7990TH                                                                         |                                          |                          |
|------------------------------------------------------------------------------------|------------------------------------------|--------------------------|
| Control System                                                                     | PWM                                      |                          |
|                                                                                    | Pulse Width: 900~2100μs(Center:1500μs)   |                          |
| Connector Type                                                                     |                                          |                          |
| Position Sensor Type                                                               | Contactless Magnetic Encoder             |                          |
| Motor Type                                                                         | Coreless                                 |                          |
| Amplifier / MCU                                                                    | 8bit programmable Digital                |                          |
| Operating Voltage Range**                                                          | 3.5V ~ 8.4V                              |                          |
| Operating Voltage                                                                  | At 6.V                                   | At 7.4V                  |
| Operating Speed at no Load                                                         | 0.21sec/60°                              | 0.17sec/60°              |
| Stall Torque                                                                       | 36.0kgf·cm (499.9 oz·in)                 | 44.0kgf·cm (611.0 oz·in) |
| Peak Efficiency Torque                                                             | 7.2kgf·cm (100.0 oz·in)                  | 8.8kgf·cm (122.2 oz·in)  |
| Rest Current                                                                       | 22mA                                     | 23mA                     |
| Running Current at no Load                                                         | 400mA                                    | 480mA                    |
| Stall Current                                                                      | 8,100mA                                  | 9,900mA                  |
| Deadband Width                                                                     | 2μs                                      | 2μs                      |
| Operating Travel                                                                   | Default                                  | ±60°                     |
|                                                                                    | Programmable                             | Max 300°                 |
|                                                                                    | Continuous Rotation                      | n/a                      |
| Operating Temperature Range                                                        | -20°C ~ +60°C (-4°F ~ +140°F)            |                          |
| Storage Temperature Range                                                          | -30°C ~ +80°C (-22°F ~+176°F)            |                          |
| Vibrations at no Load                                                              | -                                        |                          |
| Connector Wire Length                                                              | 300mm                                    |                          |
| Connector Wire Gauge                                                               | 20AWG                                    |                          |
| Connector Wire Strand Count                                                        |                                          |                          |
| External Dimensions                                                                | 43.8mm x 22.4mm x 40.0mm                 |                          |
| Weight*                                                                            | 79.0g                                    |                          |
| Ball Bearing                                                                       | 2 Ball Bearing                           |                          |
| Case Material                                                                      | Engineering Plastic & Aluminum Heat Sink |                          |
| Gear Material                                                                      | 1 Metal-Plastic & 3 Titanium Alloy Gears |                          |
| Gear Train Backlash                                                                | Max. 0.5°                                |                          |
| Horn Gear Spline                                                                   | 25T Ø6.0                                 |                          |
| Accessories                                                                        |                                          |                          |
| IP-Rating                                                                          | IP54                                     |                          |
| Revision                                                                           |                                          |                          |
| Changelog                                                                          | -                                        |                          |
|                                                                                    |                                          |                          |
| *of the servo only w/o horns and accessories                                       |                                          |                          |
| **At the Max voltage, it is recommended to be used only for a short time duration. |                                          |                          |

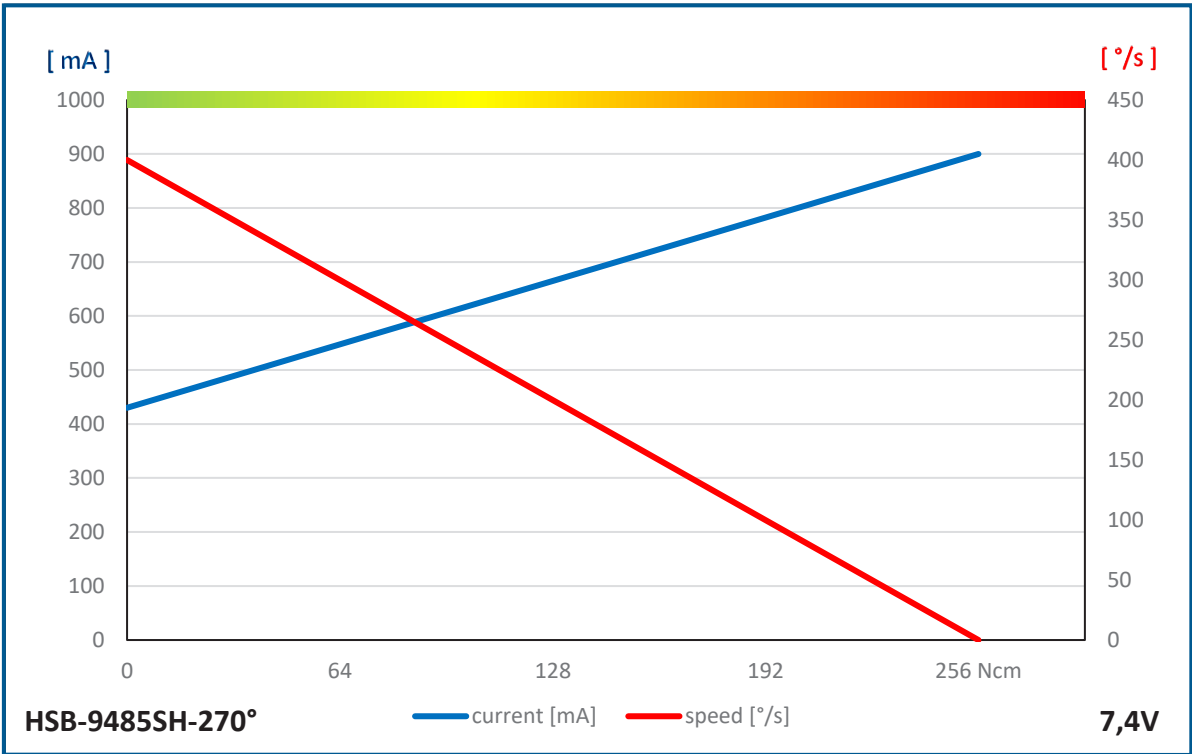
HSB-9485SH-270°

#1-00409



1:1

PERFORMANCE CHART

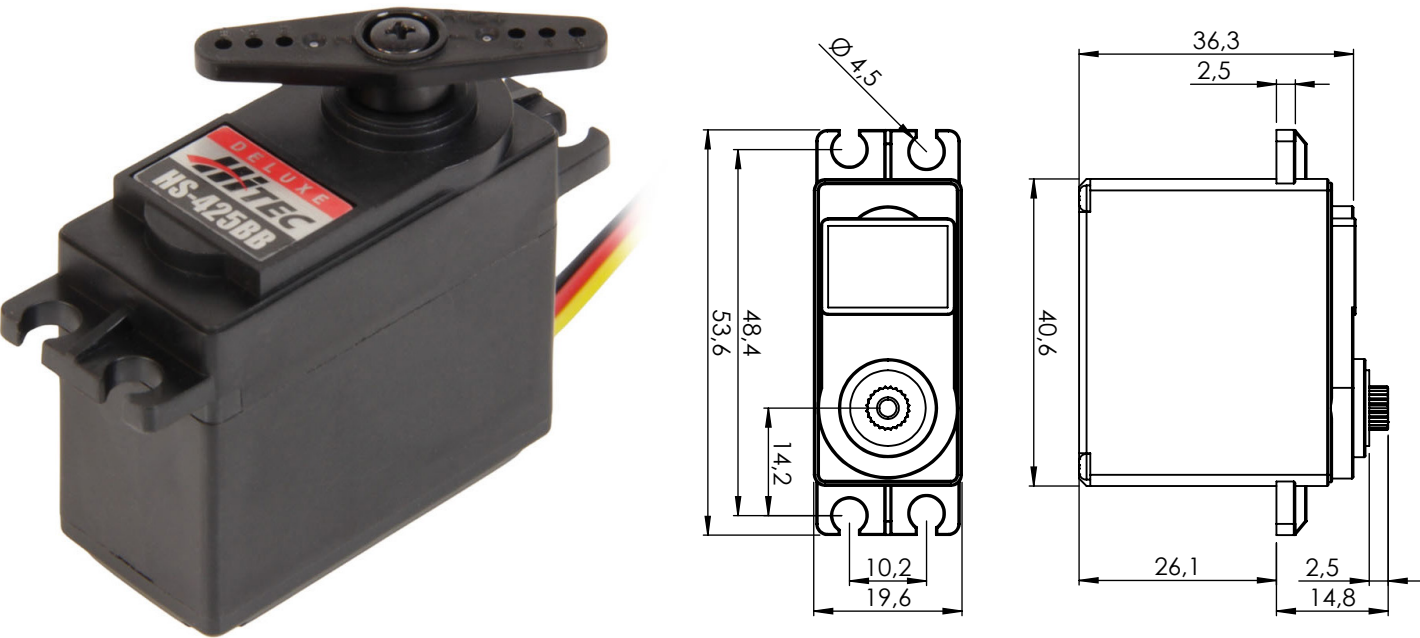


GENERAL SPECIFICATION

| HSB-9485SH-270°                         |                                                        |                     |
|-----------------------------------------|--------------------------------------------------------|---------------------|
| Control System                          | PWM                                                    |                     |
|                                         | Pulse Width 900µs 1500µs (Center) 2100µs               |                     |
| Connector Type                          | Hitec 3P (JR 3P compatible)                            |                     |
| Position Sensor Type                    | Indirect Drive / 4 Slider / 1M Cylce Long Life         |                     |
| Motor Type                              | BLDC                                                   |                     |
| Amplifier / MCU                         | 16bit programmable Digital Amplifier with Mosfet Drive |                     |
| Operating Voltage Range                 | 4.0V ~ 8.4V                                            |                     |
| Operating Voltage                       | At 6.0V                                                | At 7.4V             |
| Operating Speed at no Load              | 333°/s (56RPM)                                         | 400°/s (67RPM)      |
| Stall Torque                            | 26.0kgcm (255.1Ncm)                                    | 26.0kgcm (255.1Ncm) |
| Peak Efficiency Torque                  | 5.2kgcm (51.0Ncm)                                      | 5.2kgcm (51.0Ncm)   |
| Rest Current                            | 30mA                                                   | 30mA                |
| Running Current at no Load              | 360mA                                                  | 430mA               |
| Stall Current                           | 1100mA                                                 | 900mA               |
| Deadband Width                          | 1µs                                                    | 1µs                 |
| Operating Travel                        | Default                                                | ±60°                |
|                                         | Programmable                                           | Max. 270°           |
|                                         | Multi Turn/Continuous Rotation                         | n/a / n/a           |
| Operating Temperature Range             | -20°C ~ +60°C (-4°F ~ +140°F)                          |                     |
| Storage Temperature Range               | -30°C ~ +80°C (-22°F ~+176°F)                          |                     |
| Connector Wire Length                   | 300mm                                                  |                     |
| Connector Wire Gauge                    | 20AWG                                                  |                     |
| Connector Wire Strand Count             | 80/0.08                                                |                     |
| External Dimensions                     | 40.0 x 20,0 x 37.7mm                                   |                     |
| Weight*                                 | 62.0g                                                  |                     |
| Ball Bearing                            | Dual Ball Bearing                                      |                     |
| Case Material                           | Engineering Plastic                                    |                     |
| Gear Material                           | 1 Metal-Plastic & 3 Steel Gears                        |                     |
| Gear Train Backlash                     | Max. 0.5°                                              |                     |
| Horn Gear Spline                        | H25T Ø6.0                                              |                     |
| Accessories                             | Servo Horn (HD-LS25)                                   |                     |
| IP-Rating                               | IP54                                                   |                     |
| Revision                                | Rev. 1.0 / 09.01.2024                                  |                     |
| Changelog                               | -                                                      |                     |
|                                         |                                                        |                     |
| *of the servo w/o horns and accessories |                                                        |                     |

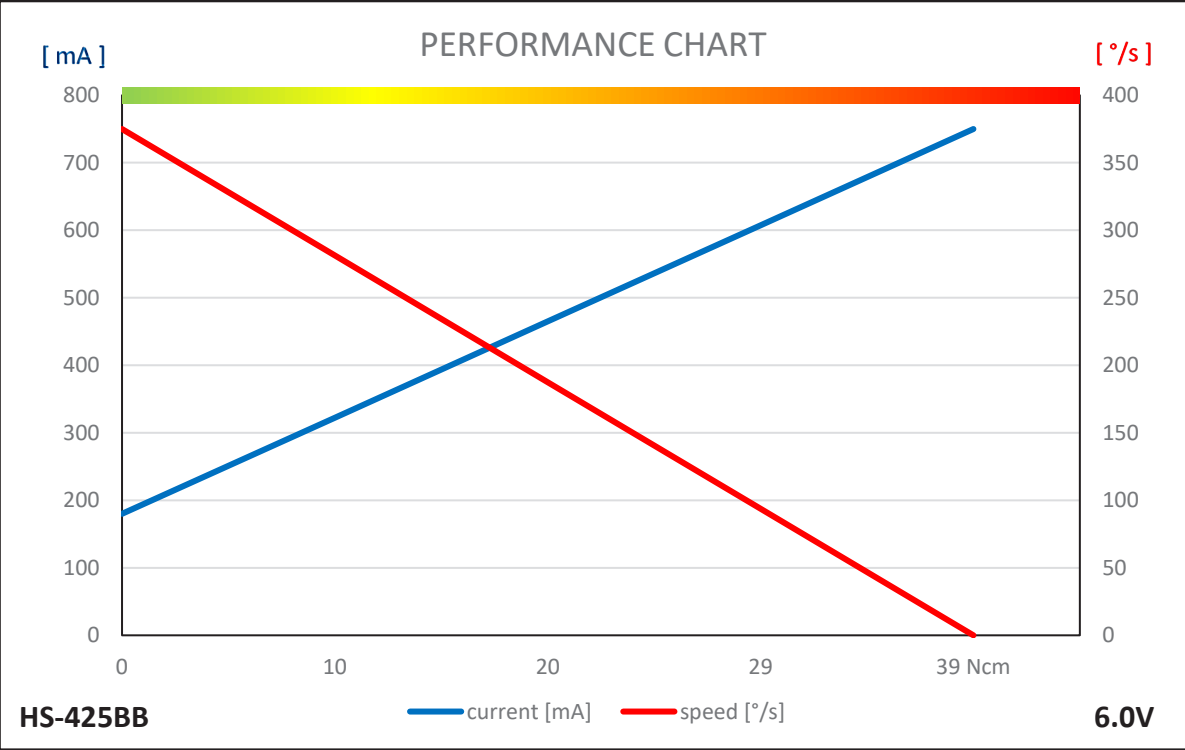
HS-425BB

# 1-03235



GENERAL SPECIFICATION

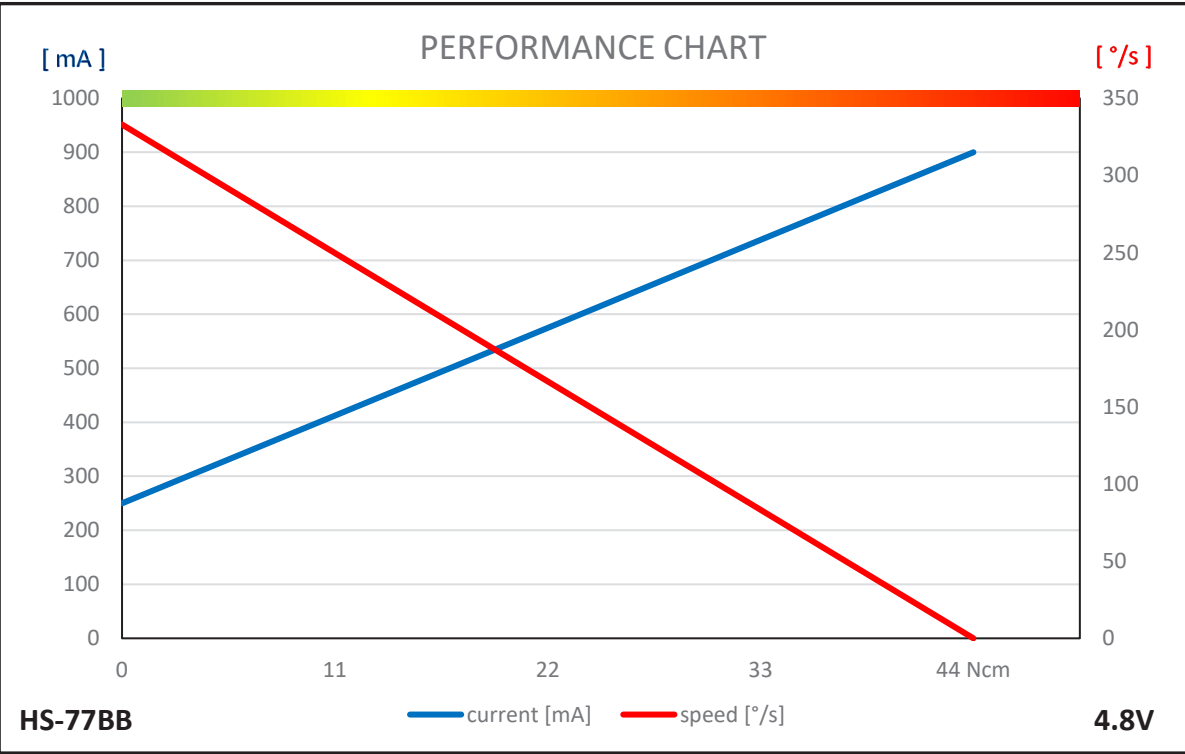
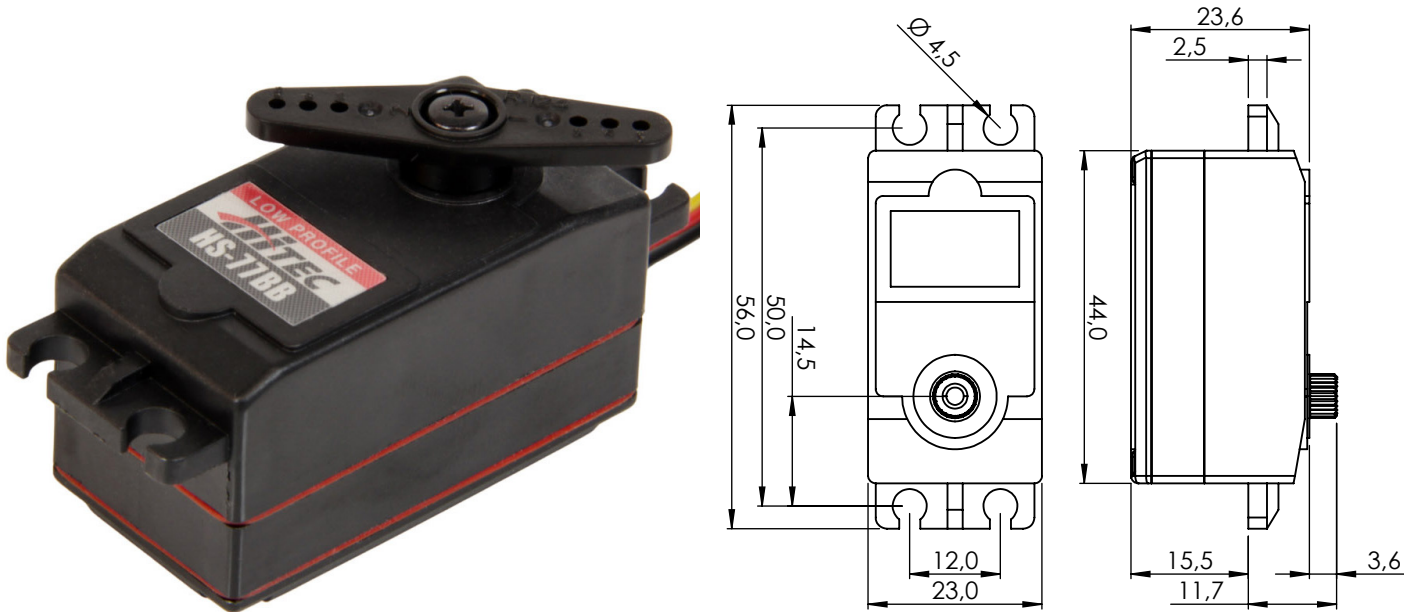
| HS-425BB                    |                                                                          |                        |   |
|-----------------------------|--------------------------------------------------------------------------|------------------------|---|
| Control System              | PWM                                                                      |                        |   |
| Position Sensor Type        | Contact Analog Potentiometer                                             |                        |   |
| Motor Type                  | Cored Metal Brush                                                        |                        |   |
| Operating Voltage Range     | 4.8 ~ 6.0V                                                               |                        |   |
| Voltage                     | 4.8V                                                                     | 6.0V                   | - |
| No Load Speed               | 0.21sec/60°                                                              | 0.16sec/60°            | - |
| Stall Torque                | 3.1kgf·cm (43.05oz·in)                                                   | 3.9kgf·cm (54.16oz·in) | - |
| Peak Efficiency Torque      | 0.6kgf·cm ( 8.3 oz·in)                                                   | 0.8kgf·cm (11.1 oz·in) | - |
| Standing Current            | 8mA                                                                      | 8mA                    | - |
| No Load Running Current     | 150mA                                                                    | 180mA                  | - |
| Stall Current               | 600mA                                                                    | 750mA                  | - |
| Deadband                    | 5μs                                                                      | 5μs                    | - |
| Operating Travel            | Default: ±60°, Non-programmable / Pulse Width: 900~2100μs(Center:1500μs) |                        |   |
| Continuous Rotation         | n/a                                                                      |                        |   |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                             |                        |   |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                            |                        |   |
| Connector Wire Length       | 300mm (11.81inch)                                                        |                        |   |
| Connector Wire Gauge        | 24WAG                                                                    |                        |   |
| Dimensions                  | 40.6mm x 19.8mm x 36.6mm (1.598inch x 0.780inch x 1.441inch)             |                        |   |
| Weight                      | 46.0g (1.623oz)                                                          |                        |   |
| Bearing Type                | 2 Ball Bearing                                                           |                        |   |
| Case Material               | Engineering Plastic                                                      |                        |   |
| Gear Material               | 4 Resin Gears                                                            |                        |   |
| Gear Train Backlash         | Max 0.5°                                                                 |                        |   |
| Horn Gear Spline            | 24T(Ø6)                                                                  |                        |   |
| IP-Rating                   | IP4X                                                                     |                        |   |
| Servo Amplifier Type        | Analog Contorller                                                        |                        |   |





HS-77BB

# 1-03236

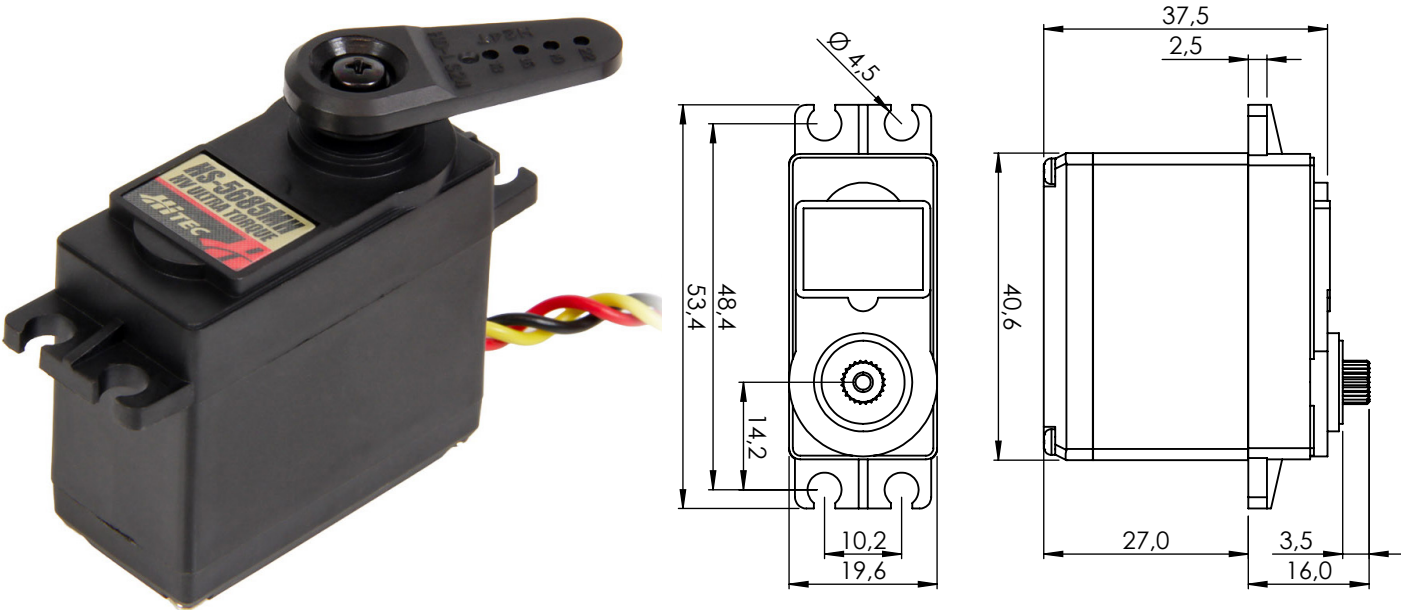


GENERAL SPECIFICATION

| HS-77BB                     |                                                                            |   |   |
|-----------------------------|----------------------------------------------------------------------------|---|---|
| Control System              | PWM                                                                        |   |   |
| Position Sensor Type        | Contact Analog Potentiometer                                               |   |   |
| Motor Type                  | Cored Metal Brush                                                          |   |   |
| Operating Voltage Range     | 4.8V                                                                       |   |   |
| Voltage                     | 4.8V                                                                       | - | - |
| No Load Speed               | 0.18sec/60°                                                                | - | - |
| Stall Torque                | 4.4kgf-cm (61.1 oz-in)                                                     | - | - |
| Peak Efficiency Torque      | 0.9kgf-cm (12.5 oz-in)                                                     | - | - |
| Standing Current            | 8mA                                                                        | - | - |
| No Load Running Current     | 250mA                                                                      | - | - |
| Stall Current               | -                                                                          | - | - |
| Deadband                    | 8μs                                                                        | - | - |
| Operating Travel            | Default: ±67.5°, Non-programmable / Pulse Width: 900~2100μs(Center:1500μs) |   |   |
| Continuous Rotation         | n/a                                                                        |   |   |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                               |   |   |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                              |   |   |
| Connector Wire Length       | 300mm (11.81inch)                                                          |   |   |
| Connector Wire Gauge        | 24AWG                                                                      |   |   |
| Dimensions                  | 44.1mm x 23.0mm x 24.8mm (1.736inch x 0.906inch x 0.976inch)               |   |   |
| Weight                      | 35.0g (1.235oz)                                                            |   |   |
| Bearing Type                | 2 Ball Bearing                                                             |   |   |
| Case Material               | Engineering Plastic                                                        |   |   |
| Gear Material               | 5 Resin Gears                                                              |   |   |
| Gear Train Backlash         | Max 0.5°                                                                   |   |   |
| Horn Gear Spline            | 24T(Ø6)                                                                    |   |   |
| IP-Rating                   | IP54                                                                       |   |   |
| Servo Amplifier Type        | Analog Contorller                                                          |   |   |

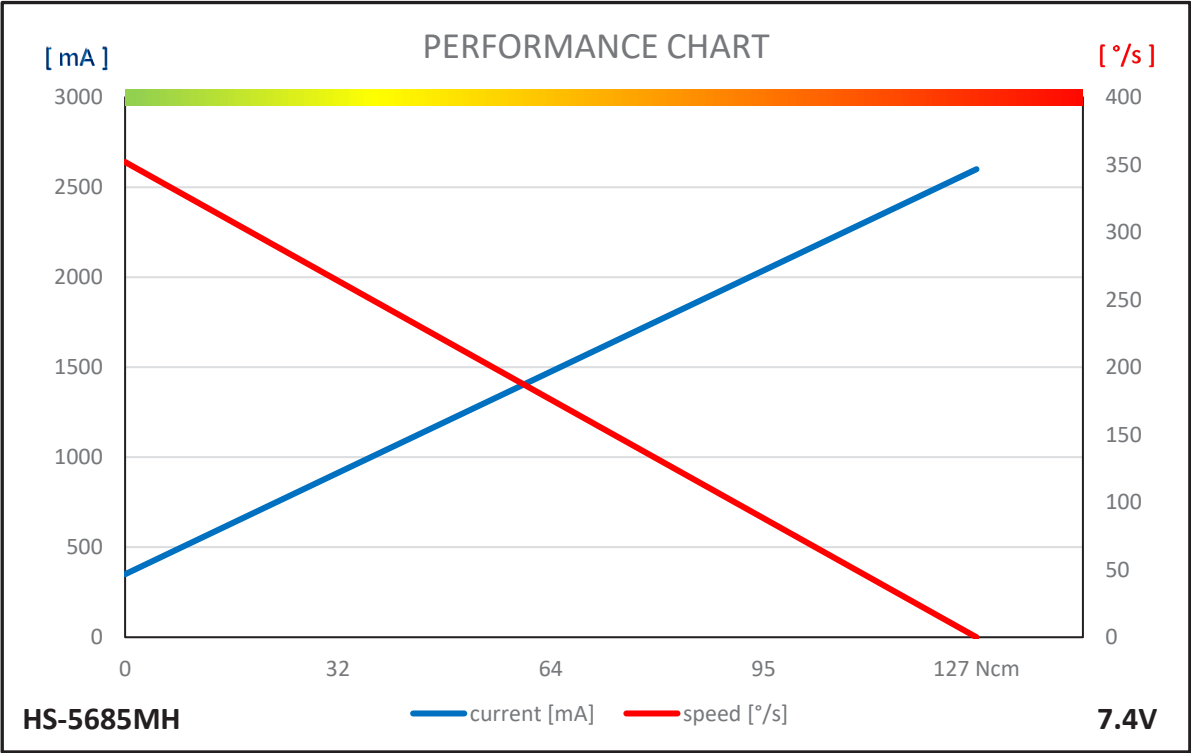
HS-5685MH

# 1-03237



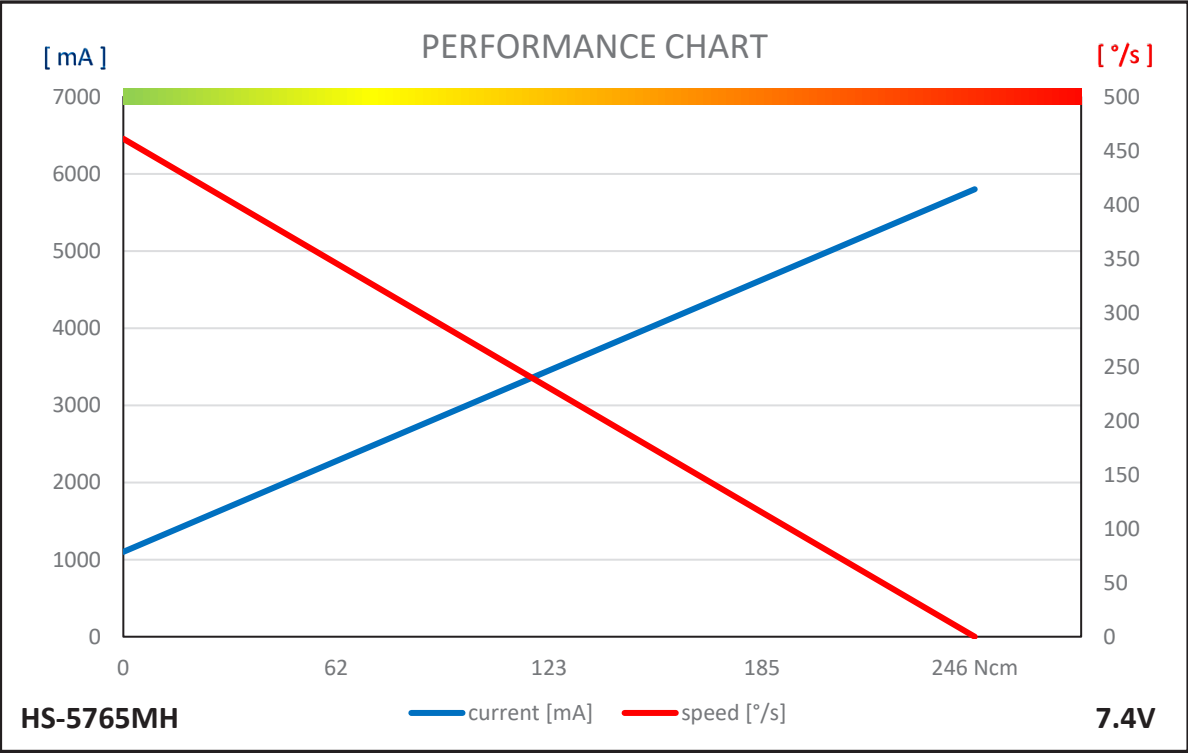
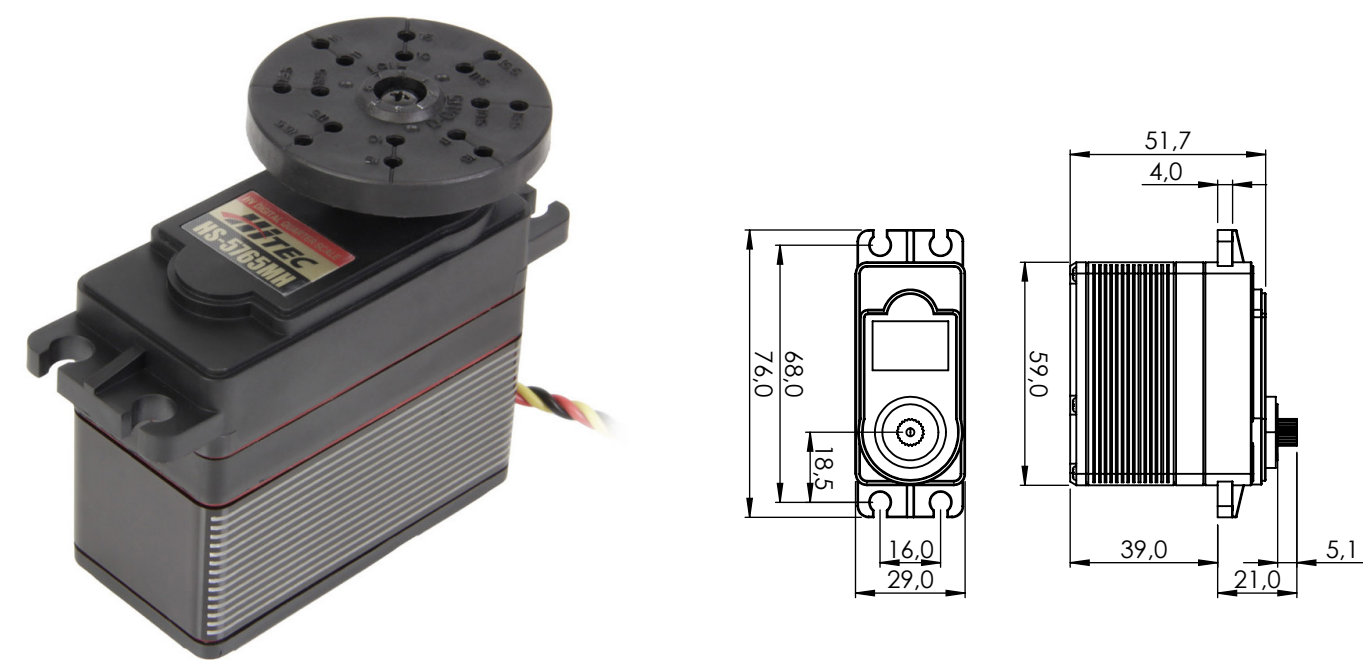
GENERAL SPECIFICATION

| HS-5685MH                   |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM                                                                            |                          |                          |
| Position Sensor Type        | Contact Analog Potentiometer                                                   |                          |                          |
| Motor Type                  | Cored Metal Brush                                                              |                          |                          |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.20sec/60°              | 0.17sec/60°              |
| Stall Torque                | -                                                                              | 11.3kgf·cm (156.9 oz·in) | 12.9kgf·cm (179.1 oz·in) |
| Peak Efficiency Torque      | -                                                                              | 2.3kgf·cm (31.9 oz·in)   | 2.6kgf·cm (36.1 oz·in)   |
| Standing Current            | -                                                                              | 6mA                      | 7mA                      |
| No Load Running Current     | -                                                                              | 280mA                    | 350mA                    |
| Stall Current               | -                                                                              | 2,100mA                  | 2,600mA                  |
| Deadband                    | -                                                                              | 4μs                      | 4μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 175° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 22AWG                                                                          |                          |                          |
| Dimensions                  | 40.8mm x 20.0mm x 37.8mm (1.606inch x 0.787inch x 1.488inch)                   |                          |                          |
| Weight                      | 60.0g (2.116oz)                                                                |                          |                          |
| Bearing Type                | 2 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering Plastic                                                            |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Metal Gears                                                |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 24T(Ø6)                                                                        |                          |                          |
| IP-Rating                   | IP4X                                                                           |                          |                          |
| Servo Amplifier Type        | 8bit Programmable Digital                                                      |                          |                          |



HS-5765MH

# 1-03238



GENERAL SPECIFICATION

| HS-5765MH                   |                                                                                |                          |                          |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|--------------------------|
| Control System              | PWM                                                                            |                          |                          |
| Position Sensor Type        | Contact Analog Potentiometer                                                   |                          |                          |
| Motor Type                  | Cored Carbon Brush                                                             |                          |                          |
| Operating Voltage Range     | 3.5 ~ 8.4V                                                                     |                          |                          |
| Voltage                     | -                                                                              | 6.0V                     | 7.4V                     |
| No Load Speed               | -                                                                              | 0.16sec/60°              | 0.13sec/60°              |
| Stall Torque                | -                                                                              | 20.0kgf-cm (277.7 oz-in) | 25.0kgf-cm (347.2 oz-in) |
| Peak Efficiency Torque      | -                                                                              | 4.0kgf-cm (55.5 oz-in)   | 5.0kgf-cm (69.4 oz-in)   |
| Standing Current            | -                                                                              | 3mA                      | 3mA                      |
| No Load Running Current     | -                                                                              | 840mA                    | 1,100mA                  |
| Stall Current               | -                                                                              | 4,700mA                  | 5,800mA                  |
| Deadband                    | -                                                                              | 5μs                      | 5μs                      |
| Operating Travel            | Default: ±60°, Programmable: Max 175° / Pulse Width: 900~2100μs(Center:1500μs) |                          |                          |
| Continuous Rotation         | n/a                                                                            |                          |                          |
| Operating Temperature Range | -20°C ~ +60°C (-4°F ~+140°F)                                                   |                          |                          |
| Storage Temperature Range   | -30°C ~ +80°C (-22°F ~+176°F)                                                  |                          |                          |
| Connector Wire Length       | 300mm (11.81inch)                                                              |                          |                          |
| Connector Wire Gauge        | 22AWG                                                                          |                          |                          |
| Dimensions                  | 59.0mm x 29.0mm x 52.0mm (2.323inch x 1.142inch x 2.047inch)                   |                          |                          |
| Weight                      | 172.3g (6.078oz)                                                               |                          |                          |
| Bearing Type                | 3 Ball Bearing                                                                 |                          |                          |
| Case Material               | Engineering plastic & Aluminum Heat Sink                                       |                          |                          |
| Gear Material               | 1 Metal-Plastic & 3 Metal Gears                                                |                          |                          |
| Gear Train Backlash         | Max 0.5°                                                                       |                          |                          |
| Horn Gear Spline            | 15T(Ø8.0)                                                                      |                          |                          |
| IP-Rating                   | IP54                                                                           |                          |                          |
| Servo Amplifier Type        | 8bit Programmable Digital                                                      |                          |                          |



### Anwendungsbeispiel für HiTEC-Servos

Hier im Roboter-Arm

### Typical application for HiTEC servos –

here in a robot arm

## CUSTOMER-SPECIFIC ADAPTATION

As a sister company of Hitec RCD Korea Inc., we are able to realize individual customer requests. The following adaptations/modifications are possible:

- Changes to cable type and length
- Changes to connectors
- Adaptations to accessories
- Adaptations to packaging (outer packaging and container size)
- Programming service
- Assembly service
- Extended outgoing goods inspection (test bench and logging)
- Label changes (Nameplate, serial number, etc.)
- Product adaptations (e.g., gear ratio)
- Fulfillment of special certification requirements
- Component tracing
- Special delivery agreements (blanket orders, guaranteed delivery capabilities)



Foto: Robotzone, LLC



### Anwendungsbeispiel für HiTEC-Servos

Hier in einem Robotergetriebe

### Typical application for HiTEC servos –

In this case in a robot gearbox



# PROGRAMMING DEVICES

Hitec digital actuators offer the ability to adjust various settings and activate safety features. These parameters can be changed using various programming devices.

## HFP-30

The Hitec HFP-30 offers extensive configuration options and test functions. Its compact dimensions make it ideal for mobile use, as it does not require a computer. The HFP-30 can be used to program all Hitec digital PWM actuators.



## DPC-11

The Hitec DPC-11 is a cost-effective programming interface for use with a computer running Windows. All settings can be easily modified and optionally saved. This allows, for example, the selected settings to be easily archived or transferred to other servos. The connection is via USB.



## DPC-CAN

The Hitec DPC-CAN interface allows you to configure, update, or test Hitec CAN and UAVCAN servos. Various software applications are available for this purpose. A computer with a Windows operating system is required. The connection is via USB.



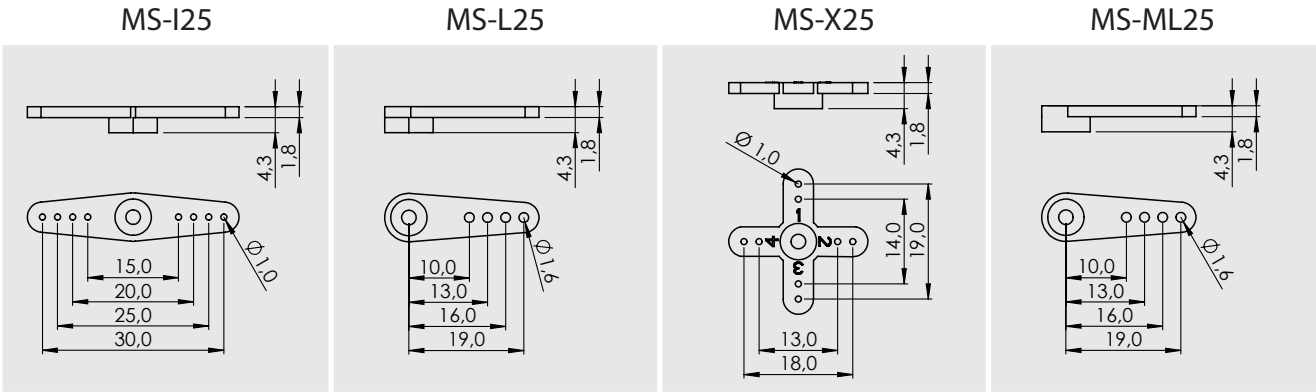
SERVO OUTPUT ARMS

A wide range of output arms is available for the entire Hitec servo portfolio.

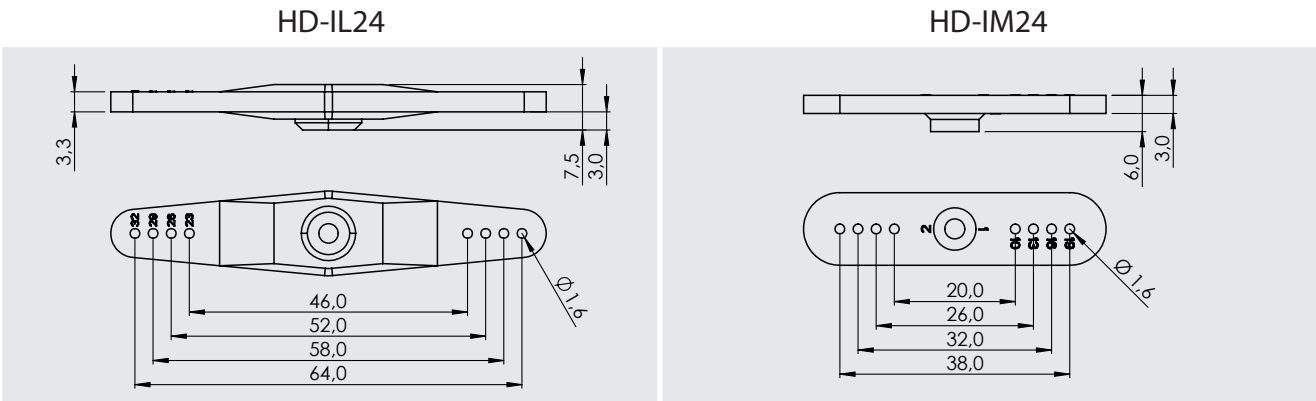
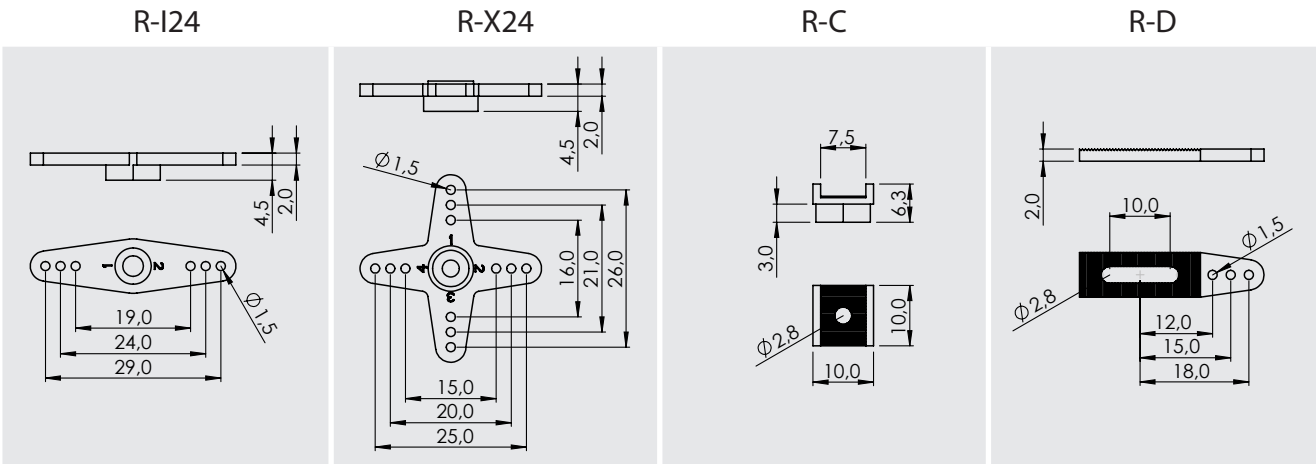
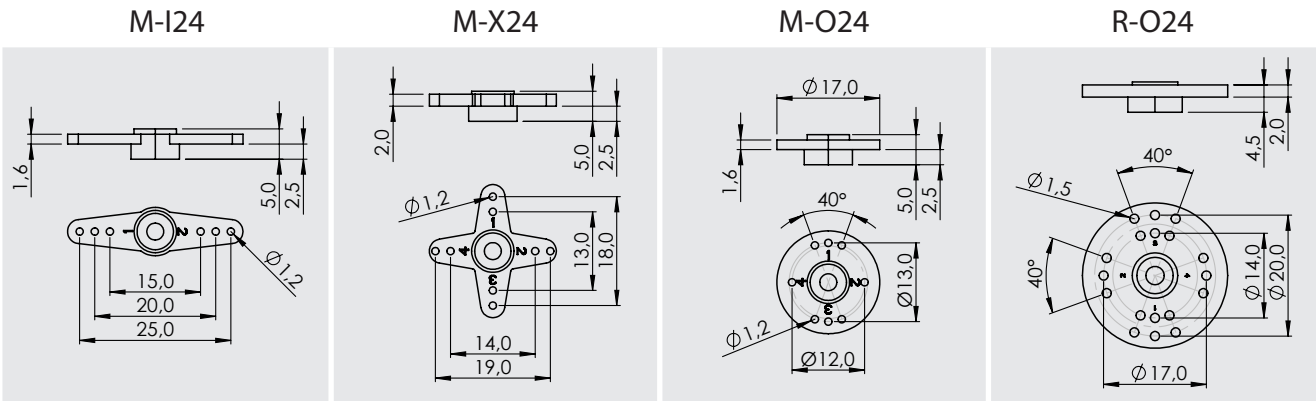
Servos usually come with a selection of suitable output arms.

For special requests, you can choose from our wide range; please contact us.

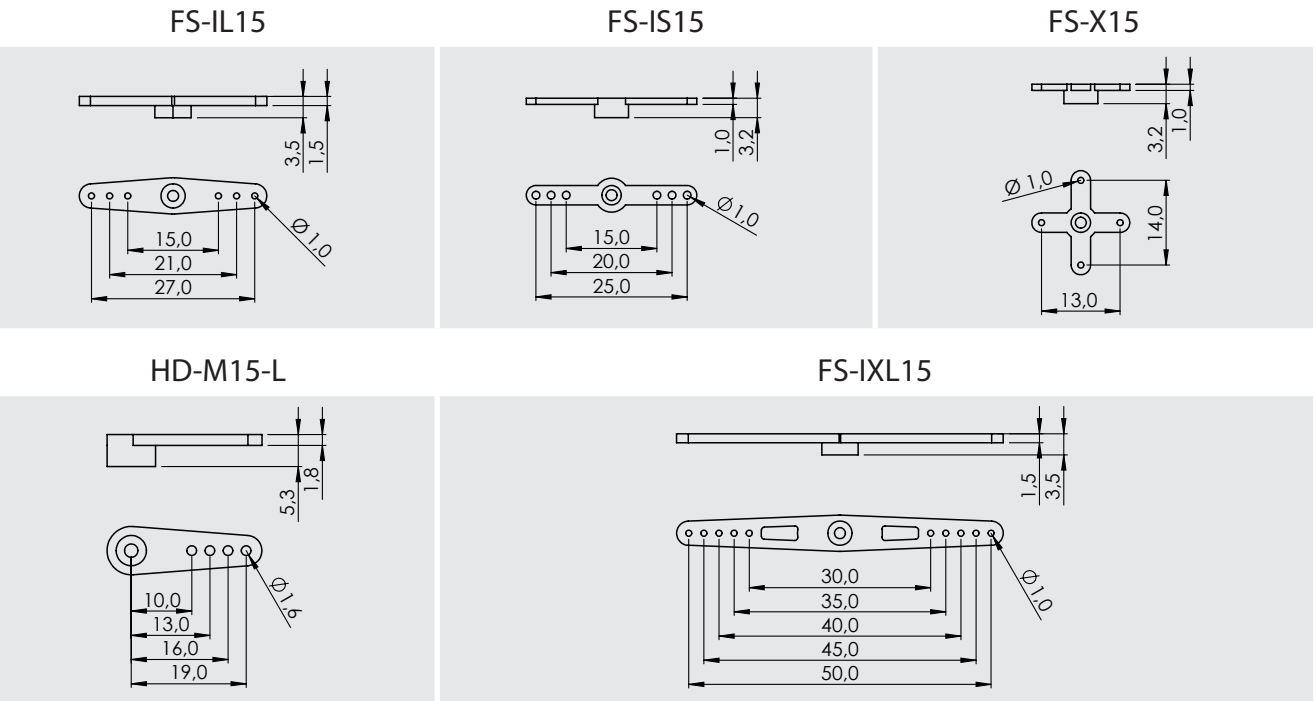
25T(Ø5,0)

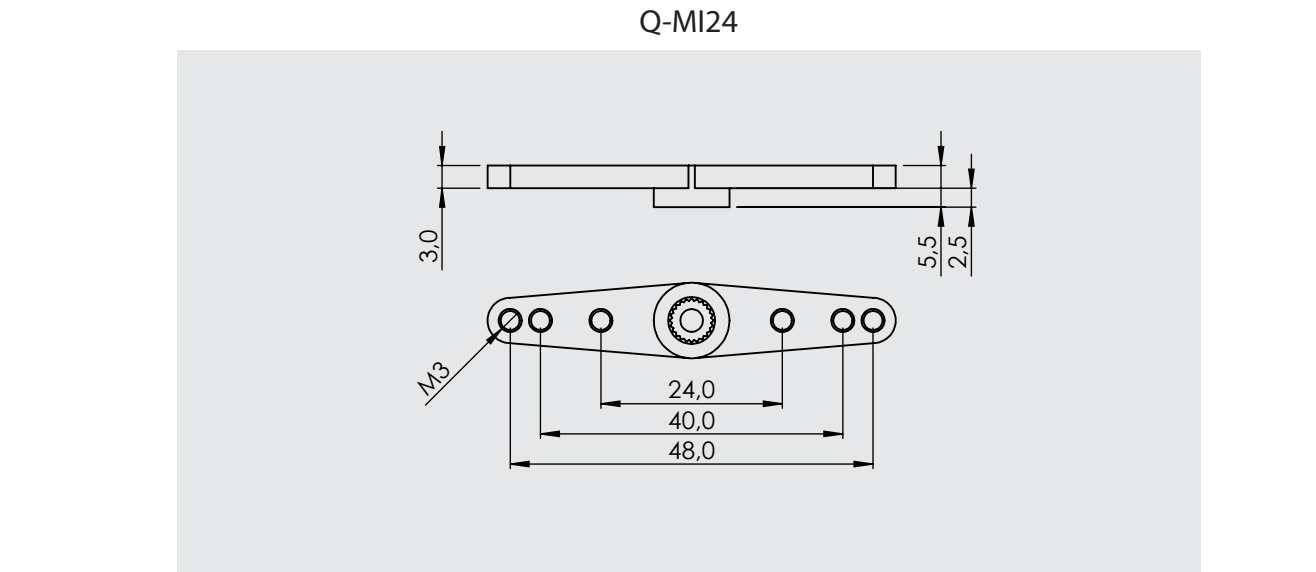
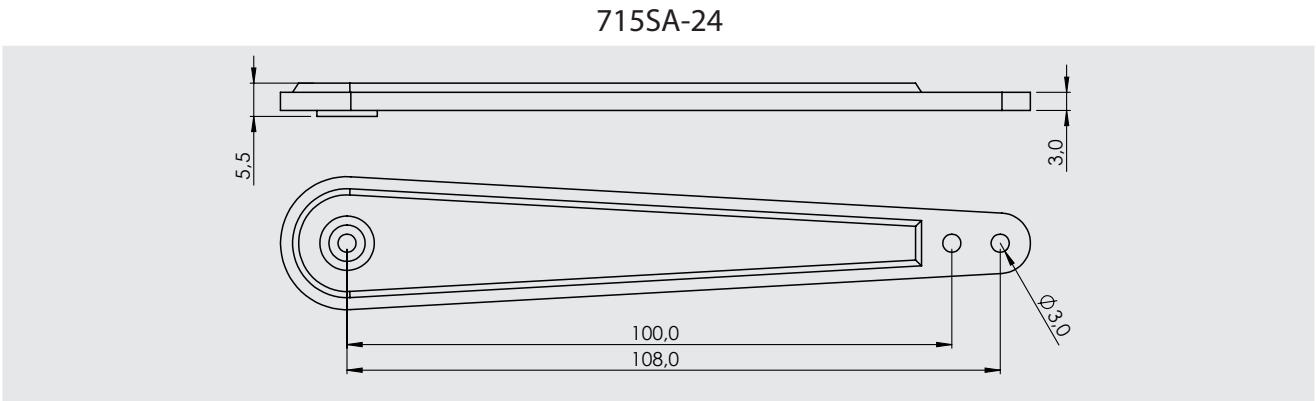
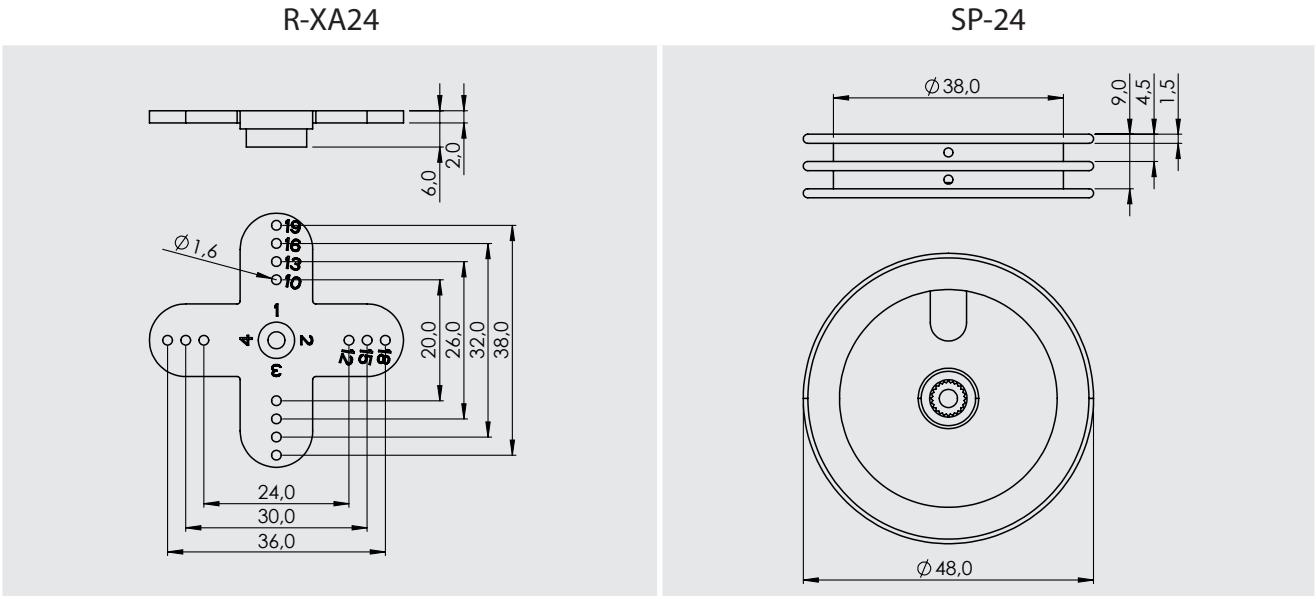
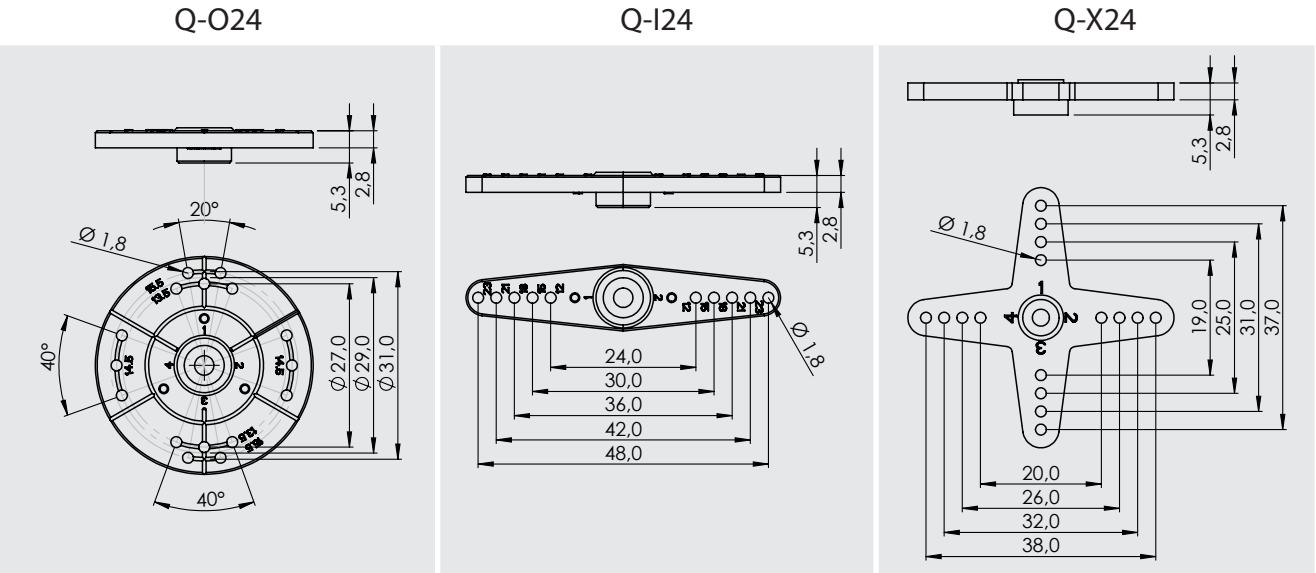
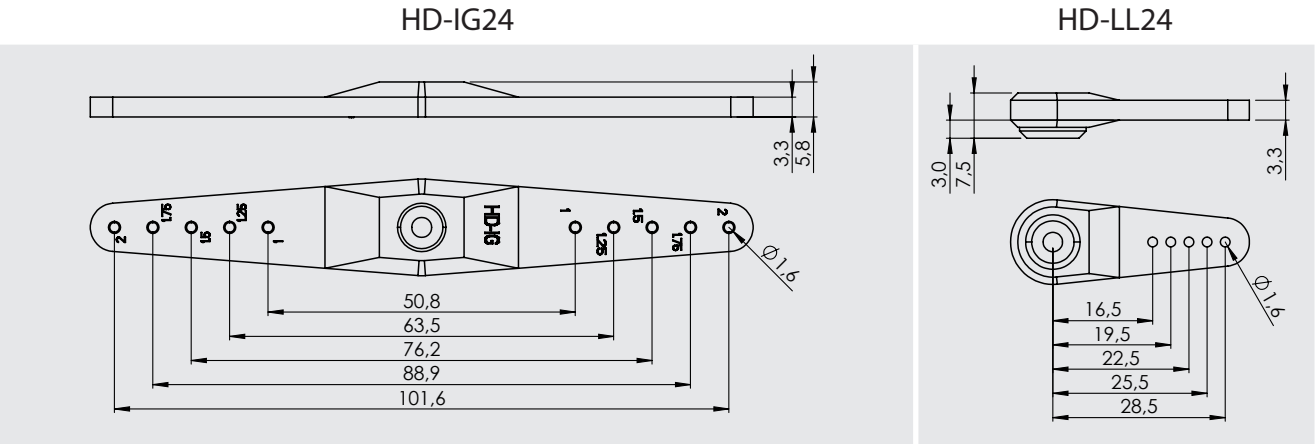
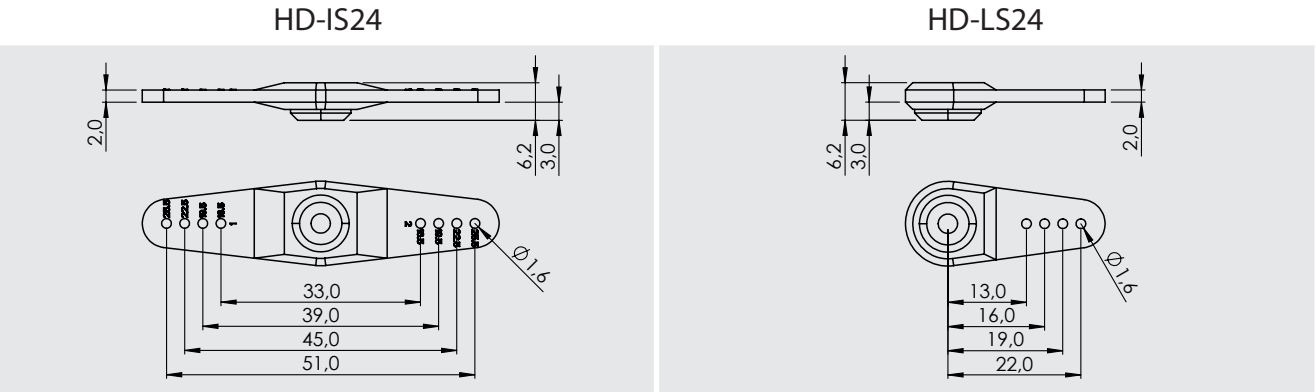


24T (Ø6,0)

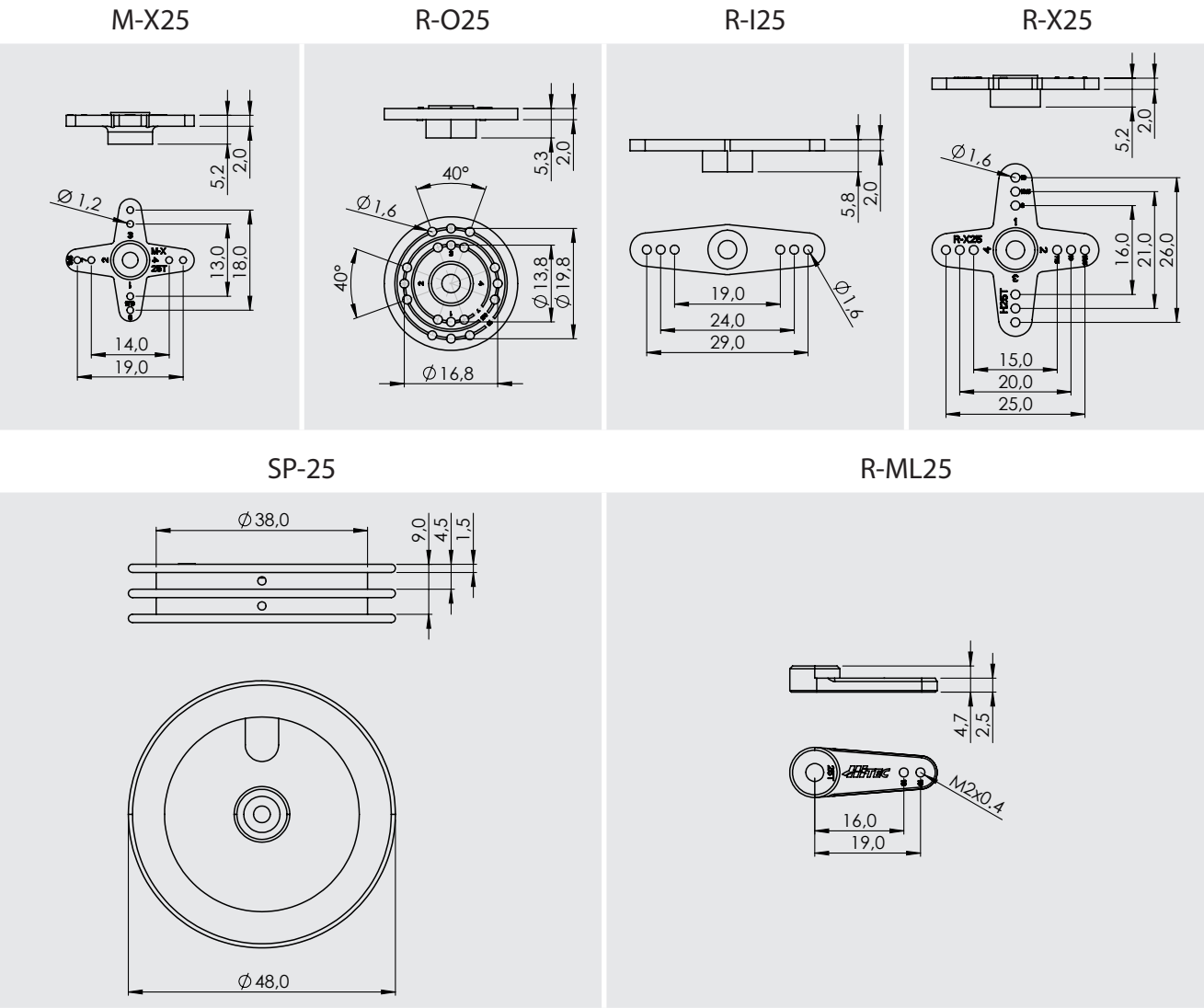
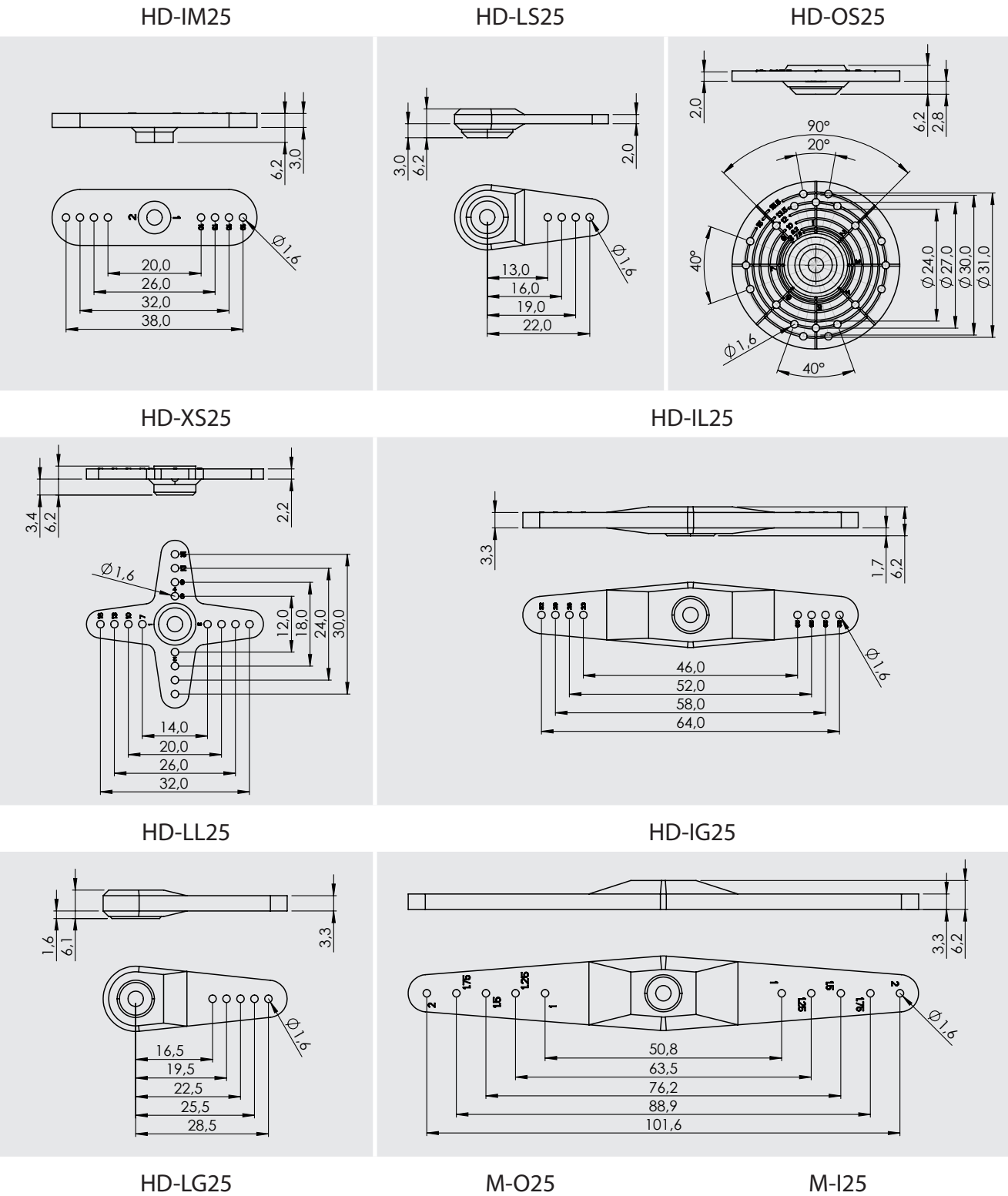


15T(Ø4,0)

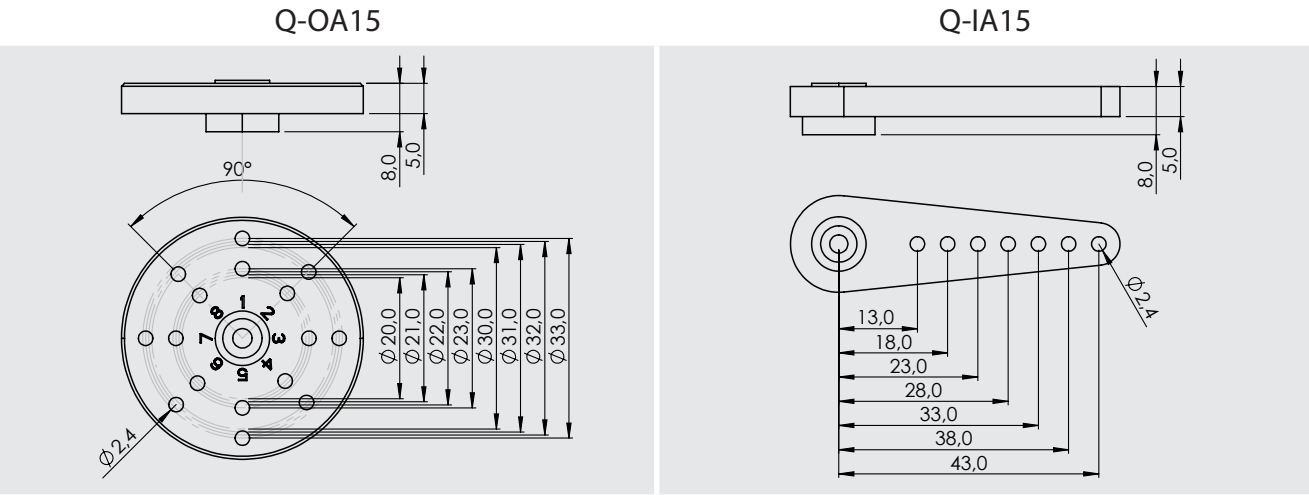




H25T(Ø6,0)

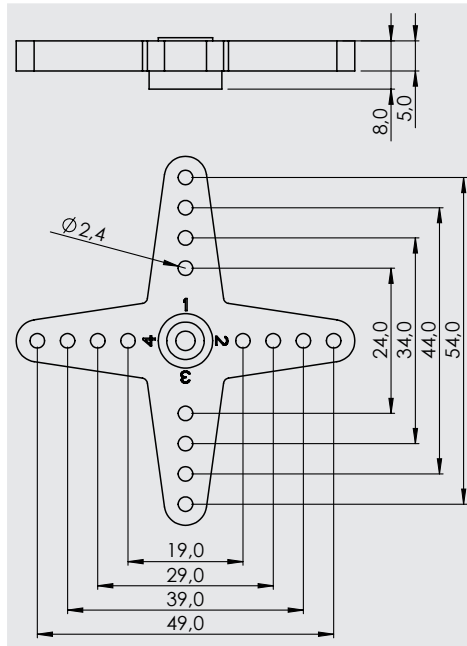


15T(Ø8,0)

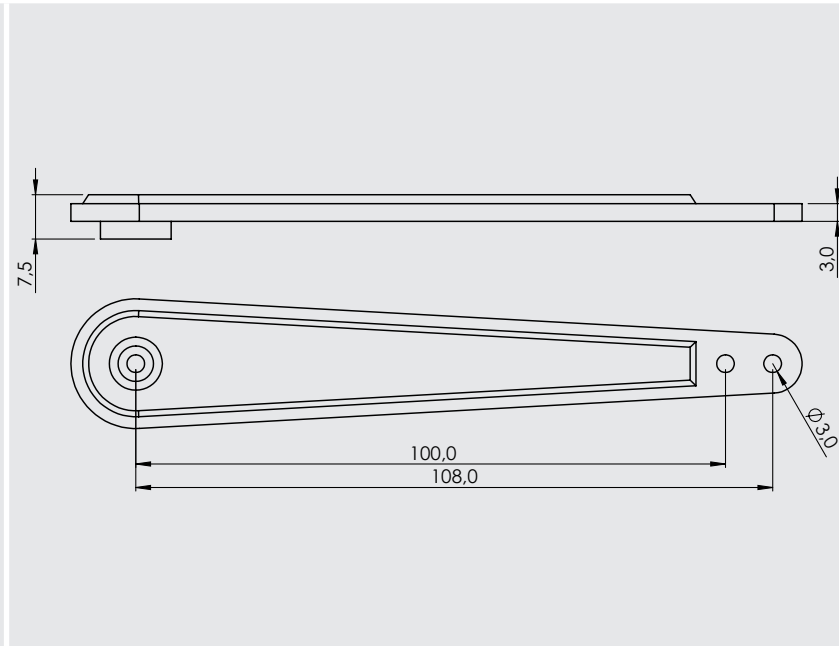




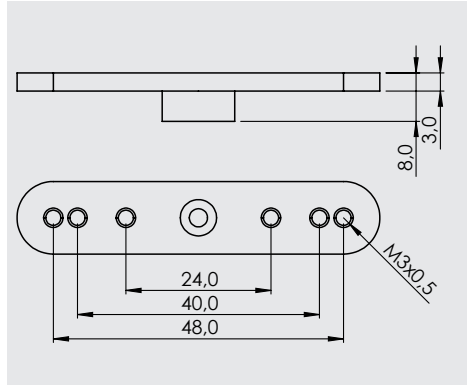
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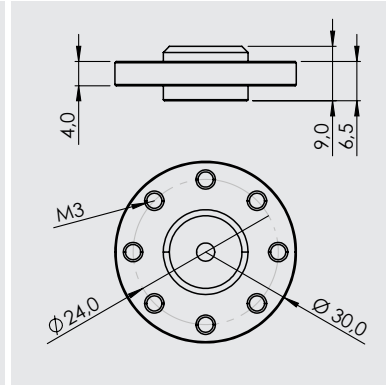
825SA-15



Q-MIA15



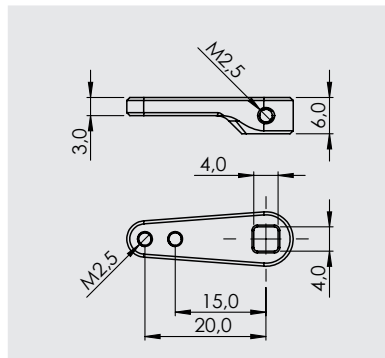
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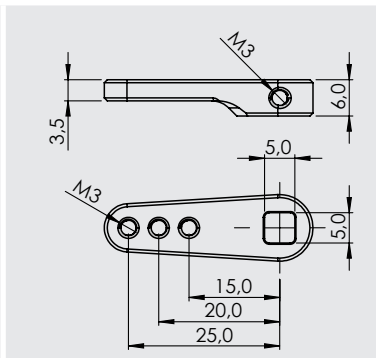
*SQUARE4*

**SQUARE5**

MIS4-A

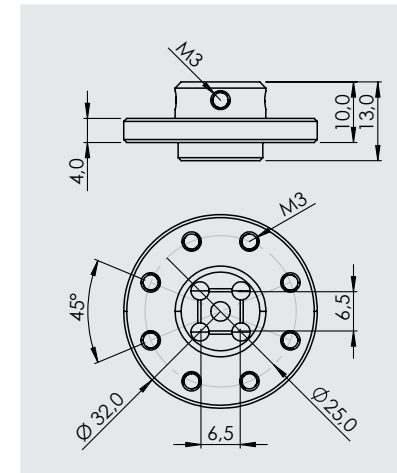


MIS5-A

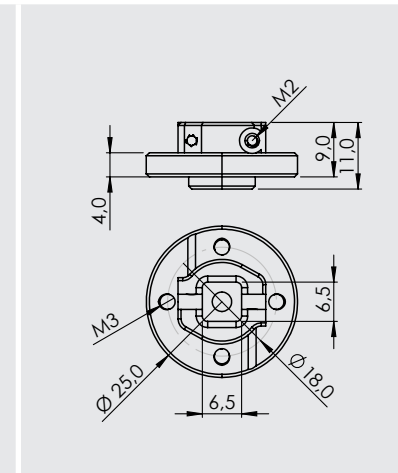


*SQUARE6.5*

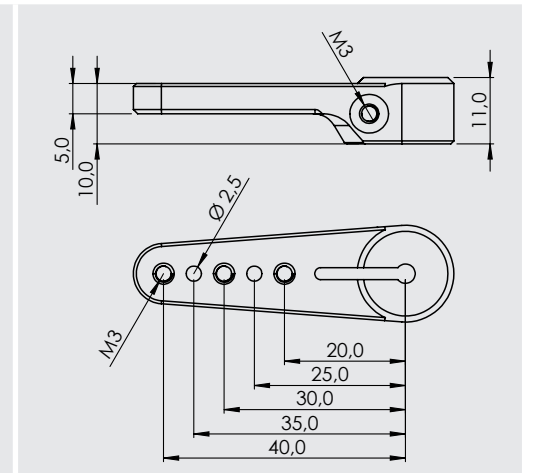
MOS6.5-S



MOS6.5-A

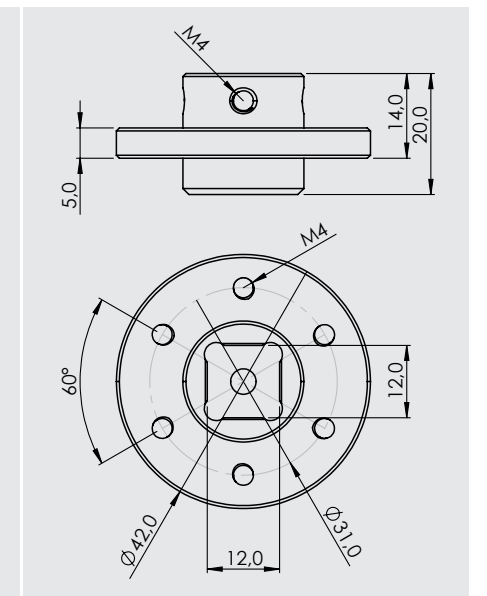
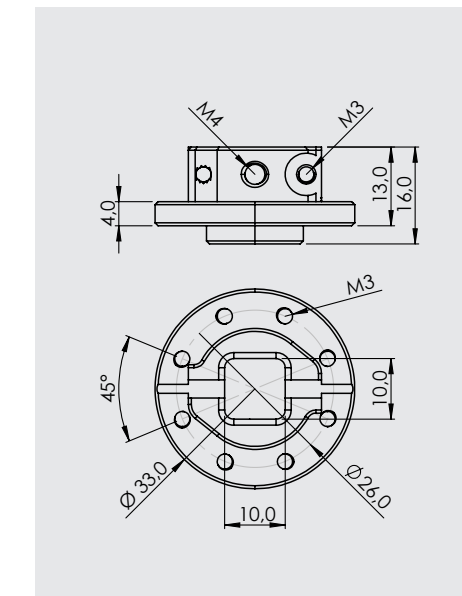


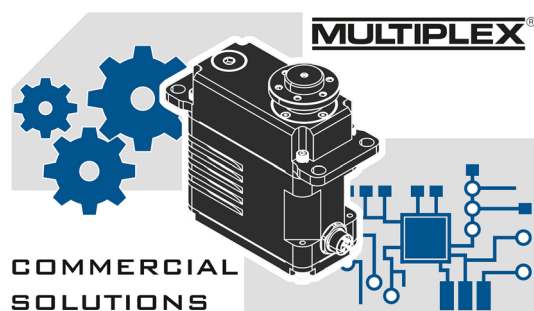
MIS6.5-A



**SQUARE10**

*SQUARE12*





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